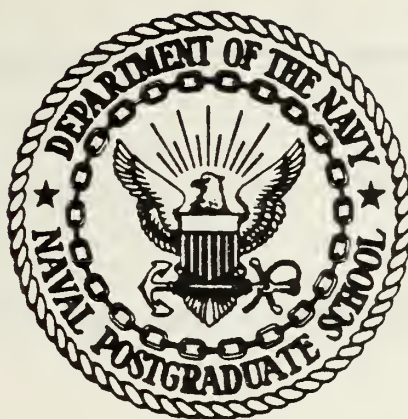CORRESPONDENT AND RESIDENT ENLISTED
TRAINING WITHIN THE U.S. COAST GUARD:
A COMPARISON

Harvey J. Langholtz

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

CORRESPONDENT AND RESIDENT ENLISTED
TRAINING WITHIN THE U.S. COAST GUARD:
A COMPARISON

by

Harvey J. Langholtz

September 1979

Thesis Advisor: R. T. Harris

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Correspondent and Resident Enlisted
Training Within the U.S. Coast Guard:
A Comparison

by

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from the

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September 1979

ABSTRACT

This Thesis compares the strengths and weaknesses of Correspondent and Resident Enlisted Training within the U.S. Coast Guard. Methods of forecasting personnel training needs are discussed. Various alternatives to meet training needs are evaluated and compared. A more general model for selecting the best training method to fill a given need is developed.

PREFACE

This Thesis is a comparison of costs associated with two methods of training used in the Coast Guard: Resident and Correspondent.

Some costs were relatively easy to document, measure and quantify with a high degree of accuracy. However, some costs could only be estimated or guessed at. Example: What is the cost of a man's practical factors qualifications in terms of both his time and his supervisors time? How is this cost allocated between on the job training and regular work? In situations like these, I either had to just ignore the question (which means assigning a value of $0) or estimate as best I could.

As part of the development of cost data for the various methods of training delivery, I often had to estimate costs. Combining estimated costs with actual costs often resulted in estimates carried far beyond two or three significant figures. I often had to choose between carrying figures out beyond four decimal places (which makes the development easier to reconstruct) and rounding off (which makes the text easier to read). In general, I have tried to round off in the text but have carried the Appendices out to the full decimal place.

As part of my research, I sometimes ran into conflicting figures for the same data. Sometimes, computer based records

would give me one figure, Headquarters staff a second, and a training source a third. In most cases, the expense of reconciling unmatching figures would probably reveal different methods of measurement, counting, categorizing, etc. None of the differences in the input data would result in large variation in the final output data and conclusions. However, realizing the potential problems of advancing an argument with variant data, I made it a point to compare figures from the same source wherever possible, knowing that unexplained variance between data sources did exist.

During the text, I refer to MKA School, DCA School, etc. I realize that these are not actually "Schools" but rather courses within Schools. For the purpose of discussion, it is easier to think of these courses as "Schools."

I ask the reader to bear with these problems in estimation of data (carried to nine decimal places) and conflicting figures, and to look at the macro view of training costs that takes form. The strengths and weaknesses of Correspondent and Resident training will become readily apparent to you as they did for me.

ACKNOWLEDGEMENTS

This Thesis is a synthesis of inputs from many people and probably represents the ideas of those who so patiently gave advice, support and recommendations as much as it does any originality on the part of the author.

I would like to express my thanks to all those whose contributions assisted in the completion of this Thesis. Above all, I would like to thank my Thesis Advisor, Dr. Reuben Harris of the U. S. Navy Postgraduate School for his patience, recommendations, guidance and insight.

Additionally, I am indebted to CDR R. McGonigal and CDR J. Horton, both of the Navy Postgraduate School, whose comments on previous projects on related subjects provided early direction for the final Thesis. My thanks to LCDR Jack Stumpff and Mr. Mike Claudfeller of U. S. Coast Guard Headquarters who provided most of the data used in this Thesis. My thanks also to LCDR Dave Lyon of Coast Guard Headquarters who assisted me in gathering data at Headquarters.

The original idea for this Thesis came from discussions with Capt. James Furgeson, Commanding Officer, Coast Guard Institute, Oklahoma City to whom I am especially indebted. His interest in the best "mix" of training modes steered me towards the direction of comparing Resident and Correspondent training costs. Any deviation or wandering from that original goal is my fault, not his.

Finally, I thank my wife, Danielle, for her valuable
recommendations concerning areas of this Thesis needing
emphasis and expansion and also for her patience with
papers stacked all over our house.

For any errors, mistakes or misjudgements that may
have been made, I claim responsibility. Any fault with
this Thesis must be blamed on me and not on those who
assisted me.

Harvey Langholtz
Monterey, California
August, 1979

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CHAPTER 1. INTRODUCTION

There presently exist two methods of training delivery within the Coast Guard: Resident and Correspondent. Resident includes training done in a school environment under the direction of an instructor. Correspondent includes training delivered through written material being provided to a student for use at his/her own pace without an instructors supervision. It may be argued that other methods do exist i.e., television, computer based instruction, instructor traveling to the student, OJT etc. However, these may all be considered variations and adaptations on the two original methods.

The Coast Guard has an extensive training program involving thousands of students annually. Both the resident and correspondnet methods of training delivery are utilized in the Coast Guard's training program. This Thesis will examine the two methods of training delivery as utilized by the Coast Guard and will also draw more general conclusions about the choice of resident vs. correspondent training in other environments.

I. Background and Objectives of the Coast Guard Enlisted Training Program

The Coast Guard maintains an active duty enlisted Corps with a 1978 strength of approximately 30,500 and annual growth of approximately 3/4% to 1%.[1] In order to maintain

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this corps strength (given current reenlistment rates)
approximately 6000 new people must be recruited annually
for a four year enlistment. These new recruits, after
initial Recruit Training must go on to receive specialized
job training in one of the Coast Guard's twenty-eight
Enlisted Rates (job specialities) i.e., Electrician, Radio-
man, Machinist, Storekeeper, etc. This initial rate entry
training qualifies an individual to one of the Rates at the
entry level (E-4) and establishes that individual as a
specialist with a specific skill. This rate entry training
can be received (depending on the Rate) at either a resident
Class A School, by corresondence, or both. Appendix I
summarizes the Coast Guard promotion system.

In addition to this rate entry training, the Coast Guard
also provides more advanced rate training qualifying an
individual for promotion to subsequent enlisted ranks. Class
C School is the term used for resident training for skills
beyond the basic entry level. These generally are concerned
with some specific technical skill required by the billet in
which the individual is serving. There are also Class B
schools which are longer in duration, more general in nature
and not as common in an enlisted career. For the purpose of
this Thesis, Class B and C Schools will be combined under the
name C School and will be considered as all post-A School
resident training. There are also C Schools which are non-
rate specific i.e., Leadership School, Drug and Alcohol
Counselor School, Search and Rescue School etc. These

non-rate specific and non-rate related schools will not
be considered here. Only rate-related (A and C) schools
will be considered.

It is the objective of the Coast Guards Enlisted Train-
ing program to provide this training necessary for:
1) initial rate entry and 2) subsequent promotion to higher
ranks.[3]

II. Goals of This Thesis

There are four goals of this Thesis; discussion of
training management within the Coast Guard, examination
of costs associated with the various type of training,
recommendations for the most effective mix of Resident and
Correspondent Training, and development of a more general
model for section of the most effective mix of Resident and
Correspondent Training outside the Coast Guard.

A. Training Management within the Coast Guard - Any
organization with 30,500 "employees" and 6,000 new people
each year obviously must have a broad training program with
a high degree of management of the program to provide
coordination and efficiency. As part of the planning and
coordination role of management, decisions must be made as
to; 1) How many people must be trained overall and how many
must be trained in each of the twenty-eight rates, 2) Who
will be selected to receive this training and 3) Exactly
what will they need to be trained in to function adequately
after graduation. This Thesis will discuss the role and

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methods of management within the Coast Guard's Training

Program and will discuss how decisions are reached as to

how many people will receive training, which people will

receive training and what material will be covered.

B. Costs associated with the various types of training -

The two alternative methods of training delivery (Resident

and Correspondent) each have different costs associated

with them. The biggest cost involved with resident train-

ing is the students salary. The biggest cost associated

with correspondence is course development and administration.

This Thesis will discuss the costs associated with the

various types of training within the Coast Guard.

C. Most effective mix for the Coast Guard - Given that

two alternative methods of training delivery exist, there

must be some point at which the most effective mix of resi-

dent and correspondent courses exist. This mix may involve

100% of one and 0% of the other or may involve a mixture of

both methods. This Thesis will recommend the most effective

mix of correspondnet and resident training for the areas

discussed.

D. A more general model for selecting the best mix - The

Coast Guard is not the only organization faced with selection

of the best mix of training delivery methods. Other organi-

zations in both the public and private sector are looking

for the most return on their training dollar invested. It

is the goal of this Thesis to use the Coast Guard's experience

as a basis for a more general model of training method
selection. This model will be discussed along with the
several inputs that must be considered in making the
decision.

III. Assumptions

In order to provide continuity and avoid biased com-
parisons, all analysis (unless otherwise indicated) will
use 1978 data. This will include manning levels, retention
rates, attrition and all costs (expressed in 1978 dollars).
Of course, the process of recruitment, training, promotion,
attrition, etc., is an ongoing event and a "snapshot"
covering one year is arbitrary since trends may vary over
time. Those reaching eligibility for 20 year retirement
in 1978 enlisted in 1958. The behavior of the 1978 retirees
will probably be different from 1998 retirees who enlisted
in 1978. Events ouside the Coast Guard could have an addi-
tional impact on future trends; demographic changes, rein-
statement of the draft, outbreak of war and economic trends
would all affect the Coast Guard's recruitment, retention
and retirement, all of which affect training needs. Realizing
that 1978 was just one year in an ongoing process, data will
be taken and forecasts will be made using 1978 data.

It would be too large a task for this Thesis to
separately evaluate all twenty-eight Rates in the Coast
Guard and recommend the best training mix for each. I
have selected to concentrate on the Machinist's Mate (MK)
Rate for the following reasons:

1.   It is a Rate that offers entry at the Third Class
Petty Officer level by either the Class A School or the
Correspondence Course route.

2.   It is the largest Rate, including almost 3750 billets,
roughly 12% of the Coast Guard's Enlisted Personnel Allowance.

3.   It requires roughly 750-900 rate entrants at the
PO3 level each year to maintain authorized allowance. Only
the Electronics Technician Rate comes close to this annual
need of new entrants with 500.

4.   It is a fairly representative Rate in terms of
technical sophistication. It is not a highly technically
sophisticated Rate like Electronics Technician, nor is MK
a strictly OJT, practical experience oriented Rate like
Boatswain's Mate.

All statistics used in this analysis will be for the MK
Rate, with the assumption made that the analysis done for
MK will be similar in result to that for other Rates, and
that where the Rates may vary in their training requirements,
the same method and model used to evaluate the MK rate may
be helpful for use with other Rates.

Given that 1978 data and the Machinist's Mate Rate
will be used, the following questions must be answered:
1) Was 1978 a representative year for the Coast Guard? And
2) Was 1978 a representative year for the Machinist Rate?

As shown in Appendices II and III, overall Coast Guard
1978 data does not vary considerably from 1975 to 1978.

Total inventory on non-prior service personnel[4] increased

by 3.8% from 1975 to 1976, by 2.9% from 1976 to 1977 and

decreased by .4% from 1977 to 1978. While this change in

direction may appear alarming at first, it should be remem-

bered that the range from the highest growth year (3.8%)

to the lowest growth year (-.4%) is only 4.2%. Additionally,

initial examination of Appendix III past the 20 year level

shows large percentage variations between 1975 and 1978.

However, it must be remembered that these percentages above

the 20 year mark are often based on groups of 25 people or

less and are subject to large percentage fluctuations

resulting from small sample size.

As shown in Appendix IV, the total number of separations

as a percent of total enlisted corps strength increased

slightly during the period 1976-77-78 by 15.5%, 16.8% and

17.8% respectively.

Overall, 1978 was not an unusual year in terms of Coast

Guard enlisted recruitment, training and retention.

While 1978 may have been a fairly representative year

for overall Coast Guard manpower trends, the data is not

as conclusive for the MK Rate in particular during 1978.

According to records maintained by the Engineering

School at The Coast Guard Training Center, Yorktown, Va.,

the number of quotas issued during the years 1976 through

1979 were as shown in Table 1.

Fiscal Year	Number of Graduates
1976	980
77	1,008[5]
78	812
79	980

Table 1

MK A School Quotas For FY 1976-79

It is difficult to find a "representative" year here.
While 1979 appears closer to the average, it is not yet
completed and so would provide only predicted data. 1976
and 77 data is several years old and may represent a set of
circumstances less current. 1978 is below average but is
the most recent completed year. This fluctuation in MK A
School output during the period discussed may introduce
unknown variables.

According to records at Coast Guard Headquarters (Per-
sonnel Training and Education) the number of graduates of
MK A School are as shown in Table 2 below:

Fiscal Year	Number of Graduates
1978	724[6]
79	850[7]
80	1,079[8]

Table 2

MK A School Graduates For FY 78-80

Again[9] there is no "representative" year. The school

is planning on a growth of student load of about 15% to

20% per year. To "evaluate" 1979 and 1980 data would be

using data before it happens. 1978 data will be used,

recognizing that 1976-1980 was not a period of steady

state for MK School output.

CHAPTER 2. BACKGROUND

In Chapter 1 the objectives of the Coast Guard Enlisted
Training Program were discussed in broad terms. Also dis-
cussed were the four specific goals of this Thesis and
assumptions to be made regarding data to be used in this
Thesis.

Chapter 2 will provide additional background material
about the Coast Guard Enlisted Training Program with specific
regard to the various routes to advancement available to
the individual and the role of Correspondent and Resident
training in advancement of the individual. Chapter 2 will
also meet the first goal of this Thesis as discussed in
Chapter 1: Questions regarding how many people must be
trained (forecasting), who will be trained (selecting),
and what they must learn (establishing skill requirements)
will be answered.

I. Routes to Advancement for the Individual

There are two routes by which a nonrated individual may
gain entry into the various ratings in the Coast Guard.
The first is through the Class A School. The second is by
completion of a correspondence course and demonstration of
required skills (called practical factors) and competition
on a Servicewide Exam.

A. Class A School

The Class A Schools are located throughout the
country. Coast Guard Training Center New York includes Class
A Schools for Electronics Technician, Telephone Technician,
Radarman, Damage Controlman, Gunners Mate and Fire Control
Technician. Coast Guard Reserve Training Center Yorktown,
Va. contains Machinist Mate School, Boatswains Mate School
and Electricians Mate School. The Coast Guard Training
Center located at Petaluma, California includes the Yoeman
School, Storekeeper School, Subsistence Specialist School
and Radioman School. Some Rates receive training at Navy
Schools to economize training resources but return to a
Coast Guard unit after graduation. The courses vary in
length from 10 to 54 weeks and require a minimum remaining
obligated service as long as 3 years. Upon graduation, an
individual is promoted to Petty Officer Third Class (or,
if he lacks the minimum in-service or in-grade time for
promotion, he is "designated" to a Rate to be promoted at
the Commanding Officers discretion upon completion of the
minimum require time).

B. Correspondence Training

The correspondence route to promotion requires some
additional dedication on the part of the individual. A Coast
Guardsman who is not assigned to a Class A School may enroll
in a Correspondnece Course offered by the Coast Guard Insti-
tute, Oklahoma City, Oklahoma. Courses are offered which

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lead to promotion to Third Class Petty Officer in many
(but not all) of the Rates in the Coast Guard. The courses
usually have roughly 10 to 15 lessons and include texts,
reading material and self-scoring tests. At the completion
of the lessons, the student mails away for an end-of-course
test which is administered under controlled conditions by
the individuals command. Additionally, the student must
demonstrate a series of "practical factors" required for
promotion to that rank and rate. The various practical
factors required for promotion to each rank are listed on
a "Record of Practical Factors" sheet, Coast Guard Form
3303c. A separate form is published for each Rate.

Each September and March, Servicewide Exams are
administered to all qualified Correspondence Course Gradu-
ates who desire to compete for promotion and who have a
Commanding Officers Recommendation. The results of the
exam are combined with other factors i.e., proficiency marks,
length of service, awards and others and personnel are ranked
for precedence of promotion. The Coast Guard then promotes
from the top of the list based on the needs of the Service.

The two routes of promotion offer some distinct
advantages and disadvantages to both the serviceman and the
service. The Class A Schools provide a total learning
environment in which the student has essentially no duty
other than to learn and the Service can provide close super-
vision of hands-on training and evaluation of performance.
The disadvantages of the Class A Schools are the high cost

to the Service, mostly in terms of personnel salary, lost
work time due to training and quota waiting lists which
may prevent the individual from beginning his training when
he is ready. The Correspondence route offers almost
immediate enrollment in the course of the individuals
choosing. As will be shown in subsequent sections, it
costs the service roughly $75 to $100 per correspondence
course graduate and the "training" can be done at any loca-
tion, aboard ship, etc., during the individuals spare time
while he is assigned to work at a full time job. The
disadvantages are difficulty in providing "hands on" experi-
ence and close supervision and control of the learning
experience. Entry into some rates is not available through
correspondence due to the obvious need for practical hands-
on training and experience. Among these are Hospital Corps-
man and Electronics Technician.

C. Class C School

As discussed on p. 2, Class C Schools provide resi-
dent training for skills beyond the Entry level (some C
Schools are also open to individuals below the Rank of Petty
Officer). The C School does not actually play a direct role
in promotion but often includes information which overlaps
with that required for promotion. To the extent that atten-
dance at a C School provides general professional develop-
ment, it is helpful to an individual, but offers no direct
route to promotion.

II. Forecasting Personnel Needs

In order to plan for and anticipate training needs of the Coast Guard as a whole, as well as for each of the twenty-eight Rates, a forecast must be made annually on March 15 predicting future training needs.[10] This forecast includes specific forecasts for the calendar year following the one in which the forecast was made and less specific forecasts for the following four years. This five year forecast is the key to the management of the Coast Guards training program. From this forecast, student loading, course scheduling, instructor staffing and training resources are determined. In the macro sense, the Five Year Forecast coordinates training Coast Guard wide and insures that an adquate number of trained personnel will be available to meet the future needs of the Coast Guard. The process of anticipating future manpower deficits based on attrition, retirement, failure to reenlist, etc., is actually a two step process.

A. Service Deficit Forecasting and Setting of
    Recruitment Goals

The first step involves an overall forecast of shrinkage of the total Enlisted Corps. Reasons for a given individual not continuing on active duty from one year to the next may include anything from normal expiration of enlistment or retirement to dishonorable discharge for disciplinary reasons. By examining recent reenlistment rates at various career points (i.e., end of first four year

enlistment, end of second four year enlistment, etc.), a
forecast can be made as to what _percentage_ of those due
for reenlistment in a subsequent year will choose to reenlist
and what percentage will choose not to. This percentage is
multiplied by the actual numbers due for reenlistment during
the year in question. Additional Enlisted Corps shrinkage
is predicted based on recent history of discharges for
medical reasons, death rate, etc. Each forecasted per-
sonnel loss must be scheduled for replacement at the recruit
level to maintain a given force level. Additionally, any
anticipated growth (or reduction) in Enlisted Corps strength
to fill newly funded (or cancelled) billets will represent
a needed increase (or decrease) in recruiting goals.

    Put simply:

    Required Recruit Input = All Losses + Growth (or - Reduction)
                            in Total Enlisted Corps.

    As a partial example, forecasting FY 1979 required
Recruit input will be demonstrated using Fy 76, 77 and 78
data: Our records indicate that for those nonprior service
personnel completing their first four year enlistment,
reenlistment rates for FY's shown were as shown in Table
3 below.

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FY	Retention Rate
76 (9/30/75 - 9/30/76)	33.3%
77 (9/30/76 - 9/30/77)	34.8
78 (9/30/77 - 9/30/78)	34.8
Combined	34.4

Table 3

Reenlistment Rates for Nonprior Service Personnel
Completing First Enlistment FY 76-78

We also know that 4413 people will complete their
first four year enlistment during FY 79. Based on recent
history, we can expect about 34.4% of these 4413 people to
reenlist and the remainder to leave. The 65.6% (100 - 34.4)
of 4413 indicates that roughly 2895 people in this category
(completing their first four year enlistment) will need to
be replaced. To this figure is added the other expected
replacements required for other length of service categories
(prior and nonprior service) to derive the total losses
expected. Anticipated billet growth (or reduction) would
be added (or subtracted). The total figure arrived at using
this method was 7037 Required Recruit Input for FY 1979.

B. Skill Deficit Forecasting Broken Down by Rates

Once this first step has been completed and the "whole
Coast Guard" Recruit Input figure is arrived at, the second
phase can begin in which individual rate requirements may
be considered. The various rates do not require an equal

number of new trainees each year for two reasons; the various

Rates vary widely in the actual number of personnel in

their ranks and they vary as to the percentage of their

ranks who choose to remain on active duty. As an illustra-

tion, during a recent 12 month period, 701 Machinists com-

pleted their first enlistment, while only 11 Fire Control

Technicians fell in the same category. Reenlistment rates

varied from Rate to Rate by as much as 20%.

In order to forecast what the skill deficit will

be in a given Rate, a procedure similar to the "Whole Coast

Guard Approach" is followed. The number of anticipated

losses is calculated for each Rate by multiplying the

reenlistment rate (a percentage) by the number of people in

that Rate (meaning skill specialty) who are scheduled to have

enlistments expire. This procedure is done separately for

those completing first enlistments and subsequent enlistments.

The total decrease in manpower strength for each Rate is a

total of retirements, first enlistment losses, subsequent

enlistment losses, disability and other losses.

As with the "Whole Coast Guard"

Required Input
For Each Rate   =   All Losses From That Rate + Growth
                    (or - Reduction) in Size of Rate

C.   Level (Location) of the Deficit

To summarize, we have seen how the total number of

required recruits is determined as well as the proportion

of those recruits who need to be assigned to each of the
28 various Rates. It should be also noted here, that no
differentiation has been made within rate i.e., differen-
tiating a need for a Chief Machinist vs. a Third Class
Machinist. Since the Coast Guard has essentially no mid-
career personnel input, it is obious that all personnel
entry is at the bottom level. Since the only place the
system will accept a new personnel input is at the bottom,
the career level at which a skill deficit exists becomes
a separate question from how many people we are short by.
The task of differentiating personnel within a Rate by rank
is the function of the promotion system, not the training
system. If increased advanced rate training must be pro-
vided to increase the number of skilled middle and upper
rank enlisted personnel, that training can be provided.
However, that is a separate question from the need for
introduction of basically qualified personnel at the entry
level.

    D. Routes To Promotion

        As discussed in Section I above, there exist two
possible routes to promotion (at the Rate entry level) for
the individual; Correspondence and Resident (A School).
However, individuals who enter a rate at the PO3 level come
from the A School the vast majority of the time. As shown
in Appendix V, there are nine rates in which this Correspondent/
Resident choice is available (the other 19 Rates, totaling
3001 promotions to PO3 do not offer a choice but require

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one or the other only) but only 13.8% of the actual promotions to PO3 will come from the Correspondence source and 86.2% will come from a Class A School. This heavy preference for Class A School does provide benefits (to be discussed later) including control of the number graduating, control of speed of progress, close supervision, standardization of instruction and others. However, given that the Correspondence route is available, this Resident training represents a huge outlay in terms of personnel time and salary. The student time alone represents 717.4 man years for these nine rates. In an organizatin of 30,500 people, this represents a 2.35% of total personnel that could be eliminated by changing to exclusive use of already available training alternatives!

While it does seem possible that savings may be available here, the fact remains that the Coast Guard has been unable to rely on Correspondent Course graduates to fill all vacancies requiring trained personnel. The assumption that all 2,697 A School graduates would have successfully completed a Correspondence Course if A School were not availabe is tenuous. While attrition rates for Class A School is usually well under 10%[11] failure to complete Correspondence Courses is over 50%. In 1978 the Coast Guard Institute recorded 38,037 total enrollments but only 16,086 graduates for an attrition rate of 57.7%. In 1977 the attrition rate was 54.3%.[12]

Explanations for the low completion rates and com-
paratively small numbers of Petty Officers who took the
correspondence route are many: An individual may be enrolled
in a Correspondence Course at the time he is selected to
Class A School. He may enroll in one course but decide he
prefers another Rate and return the first course. He may
be enrolled in a course at the time of discharge. Or he
may just lose interest in spending his off duty time studying.

Additionally, an A School student must meet certain
minimum aptitude test scores before assignment to an A
School, but there are no minimum test scores for enrollment
in a Correspondence Course. This creates the possibility
that an individual who could not qualify for a Class A School
ends up taking a Correspondence Course, has difficulty,
leading to failure to graduate.

In some cases, a lack of basic reading and literacy
skills have been a cause for a student having difficulty
completing a Correspondence Course. The Coast Guard has
recognized this and during recent years has initiated resi-
dent programs designed to provide an individual with basic
reading and literacy skills necessary for the completion of
a Correspondence Course or Class A School.

For whatever the reasons, where both alternatives
are available, Correspondence Course graduates alone never
make up even 25% of the promotions to Third Class Petty
Officer in a given Rate. All Correspondence Course graduates
who meet other requirements (including servicewide examinations)

are utilized. The difference between the number of Corres-
pondence Course graduates and the needs of the Coast Guard
is made up in costly Class A resident training.

     E. Planning Number of Quotas

        Once the forecasted required input is calculated
for each Rate, Coast Guard Headquarters (Personnel Training
and Education) can plan the number of A School quotas that
will be required to maintain force levels. There are two
sources from which qualified Third Class Petty Officers may
come besides A School: The Correspondence Course/Servicewide
Exam list; and enlistment of prior service personnel who
have left the Service but decide to return after a period as
civilians. The required input is decreased by the number of
Correspondence Course graduates and by the prior service
enlistments to give the total number of A School graduates
required. This number of graduates required is multiplied
by an "Attrition Shrinkage Factor." This Factor is a his-
torical estimate of the number of enrollees who fail to
complete the various courses and therefore require "over
quota filling" to provide the desired number of graduates.
Expected attrition ranges from 18% for Hospital Corpsman to
1% for Quartermasters.

        An example of this process for the Machinists Rate
is shown in Table 4 below:

```
Machinists on board as of 30 Sep 79                    3577

     less retirements                    94
     less first term losses             483
     less subsequent losses             151
     less disability and other losses   126
          total losses                                  854
Strength without replacement                           2723

     plus correspondence graduates      137
     plus prior-service enlistments      70

          added strength                                207

Total strength                                         2930
Authorized strength as of 30 Sep 79                    3764
Class A School graduates required                       864
     1 + historical attrition rate                  x    1.05
                                                         876
```

Table 4

Calculating Quotas Needed for MK A School

III. Selecting Personnel

    A. Quota Requests

        An individual who desires assignment to Class A
School makes his request on Coast Guard Form CG-4526, The
Enlisted Assignment Data Form. These requests are made
while an individual is in Recruit Training and again after
assignment to a field unit. After Recruit Training, some
people are assigned directly to an A School while some go to
work at a regular Coast Guard unit, where they may reapply
for an A School.

    B. Test Scores

        As part of the administrative procedure of applying
for an A School, the individuals scores are submitted on

a battery of aptitude/ability tests as shown below:

1. General Classification Test (GCT) measures
   ability to understand words and the relationships
   betwen words.

2. Arithmetic Test (ARI) measures ability to use num-
   bers and apply mathematical reasoning in practical
   problems. Arithmetic ability requires both an
   understanding of the process required in solution
   of problems and also speed and accuracy in funda-
   mental operations.

3. Mechanical Test (MECH) measures some aspects of
   mechanical and electrical knowledge in addition
   to the ability to understand mechanical principles.

4. Clerical Test (CLER) measures ability to observe
   rapidly and accurately. This test is a speed test.
   It is used to test aptitude for ratings such as
   yeoman or storekeeper.

5. The Electronics Technician Selection Test (ETST)
   determines abilities specifically related to
   successful completion of electronics type training.
   The test consists of subsets of mathematics,
   physics, shop practice, electricity, and radio.

   The GCT, ARI, MECH and CLER tests are administered
to all Recruits. The ETST is administered only to those
individuals applying for specialized training requiring this
test.

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C. Commanding Officers Endorsement

The Commanding Officer adds his endorsement (usually approving or disapproving), checks to see that the test scores and performance marks of the individual meet the required minimums, and adds any further recommendation or discussion as needed. It is the responsibility of the Commanding Officer to insure that school applicants are screened and that individuals with records of poor (below average or less than 3.3 on the Enlisted Evaluation Sheet) are not recommended for school. "It must be emphasized that it is still paramount that only personnel with Petty Officer potential be sent to courses."[14]

D. Submission to Headquarters

The applications are then forwarded to Coast Guard Headquarters where the individual is put on a waiting list based on rank first (E-3s getting preference over E-2s) and secondly on date of arrival of application. It is interesting to note that no attempt is made to "select" people based on skill, desire of Command endorsement. It is an accept/reject decision made in keeping with assignment policy and individuals are assigned to school based on rank and date of application, not on test scores or strength of Commanding Officers endorsement and recommendation.

E. Sources of Students

Billets for Class A Schools are issued to Regular Coast Guard personnel through three sources: 1) The field,

2) Recruiting and 3) The Recruit Training Centers. Reserves,
while trained at the same school, receive quotas through
other sources. In 1978, quotas were assigned as follows:

	Field	Recruiting	Recruit TRACENS	Total Regular
Total Quotas	520	140	80	740
Percent of Total	70	19	11	100

Table 5

1978 Distribution of MK A School Quotas

The distinction between Recruiting and Recruit
TRACENS is that 140 people were guaranteed admission to the
MK A School by the recruiter as part of their enlistment
contract. An additional 80 were allocated quotas for MK A
School while undergoing Recruit Training. The remaining
520 were issued quotas while assigned to regular Coast Guard
field units.

F. Selecting Personnel for Correspondence Courses

As can be seen above, the procedure for application
to an A School is involved and requires meeting a series of
minimum qualifications. Certainly these minimum qualifica-
tions are reasonable considering the amount of money to be
invested in an individuals A School training. However, there
are no qulaifications for enrollment in Correspondence
Courses. Additionally, there are no waiting lists or quotas.

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Any individual may enroll in one Correspondence Course at
a time. The only "screening" comes after completion of the
course, when the student desires to compete for promotion
on the servicewide exam. At this point, he must receive
a Commanding Officers recommendation based on record of
previous performance.

IV. Establishing Skill Requirements

In the previous sections, I have shown the various
routes to advancement for the individual, the numbers in
which these routes are taken, the procedure by which train-
ing needs are forecast and how personnel are selected to
each of the various schools. A final question to be answered
in addition to how many? and who? will be trained is what?
will be taught.

The decision as to what specific material will be covered
during training is made by three different sources within
the Coast Guard; The Training and Education Branch of the
Coast Guard's Personnel Office, The Program Manager for
whom the trainee will work and the Training Source. As
described below, these three sources coordinate with each
other through the Curriculum Outline to insure that the
training being provided meets the minimum level necessary
for performance of the mission.

A. Fitting A Training Need

The Coast Guard has published The Coast Guard Enlisted
Ratings Qualifications Manual (CG 311) which sets forth the

exact training requirements for each Rate and for each rank.
The Manual lists both Practical Factors and Knowledge
Factors for various subjects. For example, a Third Class
Machinist must meet the following standards in connection
with Propulsion Boilers:

Practical Factors

>Light off, raise steam, put on the line and secure
>the boiler
>Operate fuel oil burners, registers, and maintain
>atomizer parts
>Line up, operate and secure deaerating feed tank, etc.

Knowledge Factors

>Construction and operating principles of boilers
>Lighting off, operating and securing procedures for
>boilers
>Causes and effects of contaminated watersides and/or
>firesides of boilers, etc.

Separate practical and knowledge requirements are
set for each rank for Internal Combustion Engines, Steam
Machinery, Starting Systems, Fuels and Fuel Systems, Cooling
and lubricating oil systems and lubricants, Boat Machinery,
Electrical Equipment, Administration, etc.

These various requirements for promotion to E-4 become
the training requirements for entry at the bottom of the
Rate. Both Class A Schools and the Correspondence Institute
use these as their training requirements and expect students
to demonstrate proficiency in these areas as a prerequisite
to graduation.

B. Setting Practical Factors and Knowledge Factors

These Practical and Knowledge factors are not set
by the School or Institute. They are set by the Subject

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Matter Expert (SME) who is a representative of the program manager at the Headquarters level for whom the individual would normally or logically work. The program manager for Electronics Technicians is Coast Guard Headquarters, Electronics Engineering (Commandant G-EEE); for Machinery Technicians it is Naval Engineering (Commandant G-ENE); for Boatswains Mate it is Operations, Search and Rescue (Commandant G-OSR).

It is the job of the SME to review the qualifications in the Manual for validity and accuracy. The SME defines the needs for training and equipment based on changes in the Coast Guard, he reviews course performance skill and knowledge objectives and insures that Class A course terminal performance objectives are based on E-4 qualifications for the specific rates. Perhaps most important, the SME reviews the Qualifications Requirements to insure that each qualification fills some need, that the Coast Guard is requiring its people to maintain their skills in keeping with new developments and is not requiring people to meet standards which are no longer necessary or are obsolete. The SME serves as the point of contact for coordinating available expertise on a specific subject.

The Enlisted Personnel Division at Coast Guard Headquarters reviews the SME's annual report and maintains the Enlisted Qualifications Manual based on input from the SME. New qualifications may be added and obsolete or unnecessary ones may be deleted. These changed requirements

are then reflected in the material covered and performance

required by the Class A School and the Correspondence

Institute.

   C.   Deciding What Shall be Taught

The Decision Process and the Decision Makers

   There are three sources of inputs into decisions of

what shall be taught. They are: The program manager repre-

sented by the SME, Headquarters Personnel Division (or

PTE) and the training source (including the Correspondence

Institute and the various Schools).

   The Program Manager - As stated above, the program

manager designates a Subject Matter Expert (SME) as the

representative of the mission program to the training pro-

cess. According to COMDTINST 1550.8A, it is the responsi-

bility of the SME to:

   1) Define needs - Training needs change as new
equipment, missions, regulations and field problems are
introduced. The SME must update these training needs.

   2) Formulate and review course missions, scope
and objectives annually.

   3) Serve as a contact point for other interested
parties to have input into the training planning process.
Among these other parties might be other programs and
divisions, field units, training facilities and the
Institute.

   4) Ensure that Class A course objectives are based
on E-4 qualifications for the specific rate.

   5) Ensure that course length at Class C Schools is
kept to the absolute minimum essential to satisfy specific
training needs.

   It is the responsibility of Coast Guard Headquarters

(Commandant (G-PTE)) to:

1) Review and approve new training proposals and revised course curricula.

2) Review all Coast Guard curricula annually.

3) Maintain the curricula review schedule and list of SMEs.

4) Insure necessary resources are provided to resident training courses and determine training locations.

It is the responsibility of the various traning delivery sources (Schools and Institute) to:

1) Formulate curriculum and curriculum outline.

2) Determine training resources necessary for needed training.

3) Determine course length.

4) Solicit feedback from training users and update curriculum based on feedback.

5) Initiate appropriate changes to curriculum.

As can be seen in the list of responsibilities, the three players each provide a different input to the overall training management and delivery system: The SME defines the needs and expresses the requirements of the mission; PTE reviews the training and insures that students and training resources come together at needed levels; The training source actually provides the training.

The vehicle by which these three elements interface is the Curriculum Outline. The Curriculum Outline includes a statement on course mission, scope, terminal objectives, allocation of training time, topic objectives, training aids required, space requirements and homework.

It is by this process that training is updated and training needs are anticipated. Perhaps most important, this system insures that all training is provided in response to a <u>need</u> and that the need is filled at the <u>minimum</u> level <u>necessary</u> for performance of the mission.

CHAPTER 3.   AN EXAMINATION OF ALTERNATIVE
                    TRAINING METHODS

Up to this point, I have discussed the process of
management of the Coast Guard Enlisted Training Program.
I have shown how training needs are forecasted, how people
are selected, how material to be taught is chosen and how
the individual Coast Guardsman seeks advancement through the
training system.

During Chapter 3, the second and third goals of this
Thesis will be met: The costs of Correspondent and Resident
training will be discussed along with various alternative
mixes of Correspondnet and Resident training at both the A
School and C School level.

The costs are all put in dollar terms and will include
student salary, student travel, instructor salary and admin-
istrative overhead. Costs will be derived on a per graduate
basis, a per career basis and an overall annual Coast Guard
basis.

Once the costs of the various types of training have been
derived, the alternative mixes of Resident and Correspondent
training will be examined for economy and ability to fill the
training requirements. After an examination of the various
alternatives available, one alternative will be recommended
as preferred over the others. Additional recommendations
will be made based on the alternative selected.

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I. Possible Mixes of Training; Alternatives

   A. The Alternatives

       There are three alternative methods of delivering
the initial rate entry training: 1) A School, 2) Corres-
pondence and 3) A combination of A School and Correspondence
i.e., some people attend school and some qualify for promo-
tion through the Correspondence route. There are three
alternative methods of delivering post-entry training:
1) C School, 2) Correspondence and 3) A combination of C
and Correspondence i.e., all people seeking promotion take
a Correspondence Course and some people requiring specific
technical skills to perform in a billet take special C School
Training.

       Two decisions with three alternatives each produces
the 3 x 3 matrix shown below in the first half of Table 6.

Initial Rate Entry Training

Post-Rate Entry	A School only	Correspondence only	Combination A & Correspondence
C School only	1	4	7
Correspondence only	2	5	8
Combination C and Correspondence	3	6	9

Alternatives

Or, put in more detailed form:

Alternative	Initial Rate Training	Post-Rate Entry Training
1	A only	C only
2	A only	Correspondence only
3	A only	C & Correspondence
4	Correspondence only	C only
5	Correspondence only	Correspondence only
6	Correspondence only	C & Correspondence
7	A & Correspondence	C only
8	A & Correspondence	Correspondence only
9	A & Correspondence	C & Correspondence

Table 6

Training Delivery Alternatives

B. Criterion of Comparison

The alternatives will be evaluated and ranked based
upon the minimum cost required to maintain the present level
of training. However, it will be recognized that this level
is difficult (perhaps impossible) to quantify exactly and
an over reliance on the cost criteria alone without regard

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to non-quantifiables (i.e., Rate professionalism, stan-
dardization of training requirements and inappropriateness
of some methods for some subjects) may lead to minimizing
cost at the expense of training levels.

It should be noted that the criteria being used
here for comparing the various alternatives of training
delivery is a cost criteria, not quality of output. Cer-
tainly, the question must be asked: How do graduates of
the various programs compare in terms of performance on the
job? Can we expect the average A School Graduate (in whom
we have invested several thousand dollars) to outperform
his poor cousin from the Correspondence Institute or are
there few differences? Can we expect onegroup or the other
to get higher evaluation marks? Get promoted faster? Re-
enlist more often? etc.

Questions such as these would require a separate
Thesis of their own to be answered properly and thoroughly
and other than the general discussion below, the difficult
question of quality of output will not be examined.

C.   Difference in Output

The problem with attempting to differentiate the A
School Graduate from the Correspondence Graduate, in terms
of post-graduation performance is one of confounding variables.
The biggest confounding variable is the procedure for selec-
tion. As discussed above, certain test scores are required
on a battery of aptitude tests to qualify an individual for
Class A School. No such requirements must be met for an

individual who desires to enroll in a Correspondence Course.

This produces a strong bias in favor of the A School Gradu-

ate since those people arriving at the A School have already

been screened by the qualification procedure to have certain

minimum skills, while Correspondence enrollment is open

to anyone (and in fact will tend to get a percentage of

individuals below the A School cut-off which is proportionally

greater than the population, since those above the cut off

will be siphoned off to A School).

The second confounding variable is one of time spent

on the job. The A School Graduate has completed his course

in 16 weeks (unless rephased, which usually adds only an

additional week or two) while the Correspondence Student

sees the "real world" and has an opportunity to learn the

ropes from the bottom up. As a result, the Correspondence

Student will already have his "sea legs" and have at least

several months experience on the job while his counterpart

who graduated A School will be leaving an intensive training

environment but will still be "green" for a while.

The third confounding variable is one of dedication.

As discussed on page 18, once enrolled in an A School, an

individuals chances of graduating (based on history of

failure rate) is at least 80%. For the Machinist A School,

it si 95%.[15] Correspondence course completion is roughly

50%. Once enrolled in the A School, the Student has nothing

to do but learn the material assigned to him. The Corres-

pondence Student, who must budget his own time and complete

his courses during his free hours (after putting a full day on his regular job) must have a degree of maturity, desire and dedication to complete the course.

These three confounding variables, one favoring the A School Graduate and two favoring the Correspondence Graduate tend to confuse any differences between samples (sources of training). Any definite conclusions made regarding the comparability of the quality of the product of the two training systems would have to recognize these biases.

One additional confounding variable is that of test taking ability and the impact it will have on a correspondence student. In general, a face to face resident environment provides an opportunity for an instructor to observe a students hands on performance and to realize when a student has reached a given level of competency. A lack of ability to perform well on exams may sometimes be compensated for by practical performance in a resident environment. No such opportunity exists for a correspondent student. His exam answer sheet goes by mail to the Institute where it is scored by machine. There is no opportunity for the correspondence student to compensate for poor test taking ability with demonstration of practical skill. This final confounding variable may cause the correspondence system to make a "Type II" error; the failing of a student based on test scores, while in reality he has learned the practical skills necessary.

It is worth pointing out that there is probably no clear preference or opinion within the Coast Guard. A School Graduates and Correspondence Graduates fill the same billets and work side by side. Some individuals may have drawn conclusions favoring one training source or the other but the general opinion among Coast Guardsmen would probably be that differences are as much a result of the individual as they are of the training source.

Additionally, studies outside the Coast Guard fail to find any significant difference between training delivered through Correspondence or other means.[16] One study found that "It is clear that students who receive instruction by correspondence study achieve at least as well as students who study by other means including classroom instruction, programmed instruction, and television, or by the use of kinescopes of videotapes."[17] Other research studies, comparing face-to-face training with methods other than Correspondence concluded that:

> On the basis of the evidence available now
> the only reasonable conclusion that one
> can reach is that there is no measurably
> demonstrated superiority that can be
> attributed to one general method of instruc-
> tion over another, including correspondence
> study, programmed instruction, classroom
> instruction, independent study, tutorial
> instruction, or instruction where television
> is a major component. People can, and
> do, learn adequately and according to all
> evidence about as well under each method.[18]

The comparison of the quality of output of Resident vs. Correspondent training within the Coast Guard may be an

area worthy of further research. However, there is no clear

informal preference within the Coast Guard and research

done outside the Coast Guard has shown other variables to

be more important than the method by which the training

was delivered. For the purposes of this Thesis, no differ-

entiation of quality of output will be recognized, and

comparisons will be made on a cost basis.

    D. Effectiveness Evaluation

        Effectiveness analysis must recognize that some

material lends itself more readily to correspondence type

training than others. This is true for MK training, other

Rates and training outside the Coast Guard. Administration

and theory can generally be delivered by correspondence.

Technically oriented material can generally be delivered

by correspondence only when the equipment being discussed

in the Correspondence Course is readily available to the

student in the field for practice and performance as part

of his "practical factors." Technical training concerning

equipment which is not readily available in the field for

practice is not easily taught through correspondence. Recog-

nizing that effectiveness of training method will vary with

the nature of material to be taught, I have divided the

material into the three subject categories shown below:

        Category 1) Administration and Theory - Lecture or

reading material, generally available from a text, not

requiring hands on experience.

Category 2) Basic and Common Technology - Beginning
level technical material requiring hands on experience
involving equipment commonly available at most Coast Guard
units.

Category 3) Advanced or Specialized Technology -
Advanced technical material and/or material peculiar to a
specific piece of equipment which requires hands on prac-
tical experience not generally available on Coast Guard
units.

An example of Category 1, Administration and Theory,
would be maintenance schedules required on shipboard engines.
The MK trainee who had to learn the required maintenance to
be performed on various types of engines could learn the
material by either the combination of text material and OJT
offered by a Corrspondence Course, or he could learn the
same material in a resident environment. In Table 7, I
have judged the various alternatives on ability to deliver
Administration and Theory material and have rated as "Adequate"
(A) all alternatives offering Correspondence only at the
entry level. I have rated as "Adequate Plus" (A+) all
alternatives offering either A School or an A School/
Correspondence Course combination.

An example of Category 2, Common Technology, would
be adjusting the timing on a gasoline engine. This is common
equipment, generally available in the field and lends itself
to Correspondence training when paired with OJT (practical
factors). In Table 7, I have rated as Adequate (A) all

alternatives which offered Correspondence only at some point and have rated as Adequate Plus (A+) those alternatives which offer at least a resident/correspondent choice at all levels.

An example of Category 3, Advanced Or Specialized Technology, would be skills in the medical field requiring practical experience i.e., observing symptoms or operation of medical equipment not generally available at Coast Guard units (i.e., stethoscope). The only feasible way to train an individual in the skills necessary to become a Third Class Hospital Corpsman is to send him to the resident Corpsman School at some point in the training process. This need is due to the nature of the material; it is "peculiar to equipment which requires hands-on practical experience not generally available at most Coast Guard units." In many cases, even if material is not technically oriented but is just complicated or advanced, it may prove unfeasible to delivery by correspondence. In evaluating alternatives listed, an alternative offering both Resident A School and Resident C School was rated as Adequate Plus (A+) for Specialized Technology. Those alternatives offering some combination of Correspondence and Resident training was rated as Adequate (A) for Specialized Training, recognizing that the resident training period would have to come near the entry level and the individual would be severely limited in the duties he could perform until he had been to the resident school. The alternatives offering Correspondent

training only were rated as Inadequate (I) for Specialized Technology.

As shown below in Table 7, the alternative has been judged as either Inadequate (I), Adequate (A) or Adequate Plus (A+) for each type of material. An overall evaluation has been assigned based on the lowest evaluation in each of the three categories. The reason for this is that no alternatives can be judged as adequate if it is inadequate for any one of the three subject categories. The alternatives have been "ranked" with those receiving an overall evaluation of A+ (adequate plus) assigned to the first group, those with A (adequate) the second group and those with I (Inadequate) the third group.

It should be noted that alternate 4 was the only one judged as inadequate because it relied solely on Correspondence Courses for all Post-Entry training. What this alternate would mean in effect is abolishing all resident training past the entry level (C School). Those alternates judged Adequate were 2, 4, 6 and 8 involving Correspondence only at one level and either A or C School or a combination of A or C School and Correspondence Training. Those alternates judged more than adequate were 1, 3, 7 and 9, those alternatives including either the A and C School route or a combination of A/Correspondence with C/Correspondence.

F. Cost Estimations of Alternatives

The cost analysis will be based on 1978 data available from various Coast Guard Publications, records and files and

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Alternative	Initial Rate Training	Post Rate-Entry Training	Admin & Theory	Common Technology	Specialized Technology	Overall Productivity	Rank
1	A School	C School	A+	A+	A+	A+	First
2	A School	Correspondence	A+	A	A	A	Second
3	A School	C School & Correspondence	A+	A+	A+	A+	First
4	Correspondence	C School	A	A	A	A	Second
5	Correspondence	Correspondence	A	A	I	I	Third
6	Correspondence	C School & Correspondence	A	A	A	A	Second
7	A School & Correspondence	C School	A+	A+	A+	A+	First
8	A School + Correspondence	Correspondence	A+	A	A	A	Second
9	A School & Correspondence	C School & Correspondence	A+	A+	A+	A+	First

Table 7. Evaluation of Alternatives

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derived in the Appendices listed. As discussed previously
(p. 4) a series of assumptions have been made regarding
data used in this Thesis. The primary assumptions are:
The use of 1978 data and the Machinist Rate.

Since these two primary assumptions have been made
in the derivation and use of data, additional assumptions
follow as indicated below:

> 1978 Base Pay, BAS, BAQ rates.
> School operating costs reflecting 1978 data.
> A FY 1978 MK A School load of 644 (Regular) graduates.
> All students being of the rank E-2.
> MK A School lasting 16 weeks (4 months).
> Average travel costs to Yorktown, Va.
> Correspondence costs as listed in Reference 12.
> Correspondence loads as listed in Reference 12.
> A School instructors billets as shown in Appendix VI.

1. The cost of graduating one person from MK A
School is derived in Appendix VI and summarized in Table 8
below. The cost of the Instructor Staff and Supervisory
Overhead was calculated using 1978 Instructors Billets and
costed at the 1978 Pay Scale. Operating expenses were
taken from Coast Guard records. The sum of these fixed/
overhead costs was divided by the number of (Regular)
graduates to yield the Fixed Cost Per Graduate of about
$940. Student Salary was calculated for an E-2 for 16 weeks
and Travel Costs were based on Coast Guard records of aver-
age travel costs to Yorktown, Va. The total, as derived
in Appendix VI and shown in Table 8 is about $3,300 per
graduate.

```
Instructor Staff                $421,381.56
Supervisory Overhead              45,415.62
Operating Expenses               137,499.61
Total Fixed Cost                 604,296.79
Number of Graduates                    644
Fixed Cost Per Graduate              938.35

Student Salary                     1,772.40
Travel Cost                          565.46

Total Coast Guard Cost       $   3,276.21
    Per Graduate
```

Table 8

Cost Per MK A School Graduate

2. The cost of graduating one person from a Corres-
pondence Course is derived in Appendix VII and summarized
in Table 9 below. The fixed costs of $25,900 per course
for development, $137,500 Servicewide Exam Development,
$30,200 Exam Administration and $19 Administrative cost
per enrollment (all taken from Reference 12) have been
allocated in Appendix VII to produce a training cost per
graduate of $67.68 and a Servicewide Exam cost per graduate
of $10.43 for a total cost per graduate using the Corres-
pondence method of about $80.


```
Training Cost Per Graduate          $67.68
Servicewide Exam Cost Per Graduate   10.43
Total Cost Per Graduate             $78.11
```

Table 9

Cost Per Correspondence Course Graduate

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3. Cost of C School Training - The cost of C

School training is difficult to quantify as it will not

only vary with each Rate but will vary greatly for each

man within Rate depending on the specific billets he fills

during his career. As a very rough estimate of the cost of

C School training, I have used 1.5 times the cost of A

School. This figure is based on informal data and experi-

ence within the Coast Guard. It should be pointed out that

no reliable data exists on this but estimates should come

close enough for calculations here. The average Class C

School is probably between two and three weeks long. The

typical Enlisted Coast Guardsman probably attends a Class

C School about once every three years. Spread over the 16

years remaining in a 20 year career after the first enlist-

ment, this works out to 16 years divided by 3 years between

schools or about 5.3 schools. At two or three weeks per

C School, this comes to between 10.6 and 15.9 weeks per

career. The average C School student is probably in the

pay grade E-5 and so gets a salary during these 10.6 to

15.9 weeks of between $1900 and $2800 ($132.58 Base Pay +

43.33 BAQ + 3.73 Subsistence x 10.6 or 15.9 = $1904.18 or

2856.28). When this range of $1900 to 2850 is compared to

an A School student salary of about $1775 (see Appendix VI),

the ratio is between 1.1:1 and 1.6:1. It is difficult to say

if Instructor costs and Administrative Overhead vary from

A to C School but they are probably either equal or slightly

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higher for C School due to more advanced and technical equipment in use and loss of economies of scale found in large A Schools. Travel cost per man should be identical for A and C School students.

These figures indicate that career C School training costs are at least equal to A School costs and possibly 1.6 times the cost of A School training or more when other costs are considered. Realizing that these estimates are rough figures, I have estimated the anticipated cost of C School training requirements throughout a career to be about 1.5 times the cost of A School divided over the 16 years remaining in a 20 year career after the initial enlistment. As shown in Appendix VIII, this comes out to $307.14 per year or $982.86 per promotion.

Another alternative method of calculating the average cost of C School training is as follows: 1978 Cost Data for Coast Guard C School training for all enlisted personnel is as follows:

Tuition	$ 71,000
Travel	1,556,000
Per Diem	387,600
Total	$2,014,600

Table 10

Partial Cost of C School Training

If these funds were allocated equally among all

30,500 Enlisted Coast Guardsmen, the cost per man per year

would be roughly $66. However, this is only that C School

training funded by Coast Guard Headquarters. C School

training funded by units other than Headquarters roughly

equals that funded by Headquarters each year, so the figure

should be doubled to about $130.

Obviously, an average cost per man per year of only

$130 in tuition, travel and per diem indicates that in a

given year, most Coast Guardsmen do not attend C School at

all. This figure of $130 is proposed as part of the

average cost per year per man for the whole Coast Guard,

recognizing that most people will attend a C School no more

often than once every few years.

However, this $130 still does not recognize three

costs difficult to quantify. No data exists for these three

areas and, in order to arrive at even a tentative cost

figures, a great deal of estimation must be made:

a. Student Salary - These costs are for tuition,

travel and per diem only. In order to calculate student

salary, all quotas for 1978 would have to be identified and

costed at the pay scale of the student.

As a very rough estimate, the average Coast

Guardsman attends a C School roughly once every three years,

with the average C School lasting about two weeks. If it

were assumed that each enlisted Coast Guardsman attended a

two week C School once every three years, this would work out

to about two-thirds man weeks per man per year. If this were calculated for the rank of E-5 with 6 years longevity, it would come to about $110 in student salary.

b. Some C School training is done at a Training Center co-located with the individuals Command, resulting in a cost of $0 in terms of travel, per diem and tuition but not a cost of $0 in terms of student salary.

c. Instructors salary, training materials, administrative overhead, etc: These costs were found to be about 30% of total student salary plus travel cost for A Schools in Appendix VI and a similar estimate could be made for C Schools. If tuition, travel, per diem and salary combined equal approximately $240 (130 + 110) then the cost of operating the school may be estimated at 30% of that or about $72 for the cost of running the school and a total C School cost of about $312 (130 + 110 + 72) per man per year.

Realizing the large amount of estimation involved in arriving at the $310 figure shown above, I offer Appendix VIII as an alternative method, arriving at a very similar answer. As shown in Appendix VIII, if we assume that the average cost of post entry rate training spread over a twenty year career to be half again as much as the cost of the initial rate entry training, we come out with a career cost of about $4,914 (the original cost of A School from Appendix VI of $3,276.21 x 1.5). If this $4,914 is divided over the 16 years remaining on a 20 year career after the initial four

year enlistment, the cost is $307.14 per man per year, not far from the $312 calculated in the previous paragraph.

Realizing the wide variability and large amount of estimating needed to derive such a figure I will use 1.5 times the cost of A School or $307.14 per man per year or $982.86 per promotion.

4. Combined A School and Correspondence Training - As shown in Appendix IX, the average cost of some A School Graduates and some Correspondence Course Graduates being combined at present levels of output would be $2,715.21 per graduate.

5. Correspondence only - Abolishing C School and providing all post-entry level training through correspondence would require adding material to the Correspondence Courses. Again, this is very difficult to estimate and absolutely impossible to calculate accurately. If we were to totally abolish C Schools and attempted to offer all C School material by correspondence, how much would it add to the present cost associated with each Correspondence Course Graduate of $78.11 as shown in Appendix VII? For the purpose of calculation, I will assume that this increased requirement would raise the cost of each Correspondence Course by about half to $117.17.

6. Combined C and Correspondence Training - The method of combining C School training with Correspondence training (as is presently being done) involves combining the

cost of both programs together for each promotion of each individual, or $78.11 + $982.86 = $1,060.97.

As shown below in Table 11, combining the figures discussed in Sections E-1 to E-6 yields the total cost of training one person over a 20 year career, given that an individual was promoted all the way to E-9. Derivation of the figures used is shown in Appendix X.

However, the figures shown in Table 11 and derived in Appendix X show what the total cost will be for one individual to be trained over a 20 year career for promotions all the way to E-9. Obviously, most Coast Guardsmen do not stay in this long or get promoted this far, making the figures shown in Table 11 unrepresentative of the overall Coast Guard.

Alternative	Initial Rate Training	Post Rate-Entry Training	Cost Per 20 Year Enlistment	Ranked for Economy
1	A School	C School	$8,190.51	8
2	A School	Correspondence	3,862.06	3
3	A School	C School & Correspondence	8,581.06	9
4	Correspondence	C School	4,992.41	4
5	Correspondence	Correspondence	663.96	1
6	Correspondence	C School & Correspondence	5,382.96	5
7	A School & Correspondence	C School	7,629.51	6
8	A School & Correspondence	Correspondence	3,301.06	2
9	A School & Correspondence	C School & Correspondence	8,020.06	7

Table 11. Cost Per 20 Year Enlistment Per Various Alternatives

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In order to convert the figures in Table 11 from
a "Cost Per 20 Year Enlistment" figure to an "Annual Cost
to the Coast Guard" figure, the cost of each promotion must
be multiplied by the number of promotions to that Rank. As
shown in Table 12, more promotions are made to the lower
Ranks (logically) than the higher Ranks. When the various
alternatives are costed at the actual number of promotions,
this will have the effect of favoring alternatives which
economize training costs at the lower Ranks. Appendix
XI multiplies the cost of each promotion by the number of
promotions for each of the 9 alternatives in order to derive
an "Annual Cost to the Coast Guard." The results of
Appendix XI are shown below in Table 13.

Promoted to	MK3	MK2	MK1	MKC	MKCS	MKCM	Total
	617	661	313	111	22	3	1727

Table 12

1978 MK Promotions to Each Rank

Alternative	Initial Rate Training	Post Rate Entry Training	Cost Per 20 Year Enlistment	Ranked for Economy	Annual Cost To Coast Guard (In Thousands)	Ranked for Economy
1	A School	C School	$8,190	8	$3,112	8
2	A School	Correspondence	3,862	3	2,151	5
3	A School	C School & Correspondence	8,581	9	3,199	9
4	Correspondence	C School	4,992	4	1,139	2
5	Correspondence	Correspondence	663	1	178	1
6	Correspondence	C School & Correspondence	5,382	5	1,225	3
7	A School & Correspondence	C School	7,629	6	2,766	6
8	A School & Correspondence	Correspondence	3,301	2	1,805	4
9	A School & Correspondence	C School & Correspondence	8,020	7	2,852	7

Table 13. Cost Per 20 Year Enlistment and Annual Total Cost to the Coast Guard for the Various Alternatives

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II. Evaluation of Alternatives

   A. Quantifiables

      As shown in previous sections, there are two
criteria on which the alternatives may be evaluated: Cost,
which is quantifiable but requires considerable estimation
in forecasting; and productivity which is quantifiable only
in the ordinate sense that one method of delivery can sub-
jectively be judged "better" than another. Shown below are
the alternatives ranked for both cost and productivity.

Alternative	Total Cost Per Year (In Thousands)	Overall Productivity	Ranked For Economy	Ranked For Productivity
1	$3,112	A+	8	First
2	2,151	A	5	Second
3	3,199	A+	9	First
4	1,139	A	2	Second
5	178	I	1	Third
6	1,225	A	3	Second
7	2,766	A+	6	First
8	1,805	A	4	Second
9	2,852	A+	7	First

Table 14

Cost and Productivity of the Various Alternatives

      Table 14, above, is actually a summary of informa-
tion derived over the last dozen pages. For each of the
nine alternatives, the total annual cost to the Coast Guard

(from Table 13) is shown along with overall productivity
(from Table 7). The alternatives have been ranked for both
economy and productivity. As might be expected, the
alternatives which ranked highest in productivity were
also least economical.

B. Sensitivity Analysis

There are two areas of the training process which
are based on estimated forecasts; reenlistment rates and
need for advanced training.

Reenlistments - The figures presented here are based
on 1978 force strength and reenlistment rates. Obviously,
an increase in reenlistment will decrease the need for
entry level training as the number of lower grades have
fewer openings requiring replacement. A decrease in reen-
listment will mean an increased need for entry level
training.

The following table (15) shows a sensitivity analysis
of total annual cost to the Coast Guard (in thousands of
$) of entry level training with variations in the number of
MK3's required.

The costs indicated in Table 15 show what the
anticipated costs would be if the number of new MK3's varied
from its 1978 level. Obviously, a decrease in reenlistment
rates would result in an increased number of new MK3's
requiring training and an increase in reenlistment would
result in a decrease in training required. While there is

some narrowing and widening of gaps, the rank order remains
the same throughout the 40% range (20% below to 20% above FY
78 levels) in graduates per year.

NUMBER OF NEW KM3'S REQUIRED EACH LEVEL

Alternative	20% Below FY78 (494)	10% Below FY78 (555)	FY78 (617)	10% Above FY78 (679)	20% Above FY78 (740)	Rank
1	$2,706	$2,904	$3,112	$3,315	$3,518	8
2	1,745	1,948	2,151	2,354	2,557	5
3	2,792	2,995	3,199	3,402	3,605	9
4	1,129	1,134	1,139	1,144	1,148	2
5	168	173	178	183	187	1
6	1,216	1,221	1,225	1,230	1,235	3
7	2,429	2,597	2,766	2,934	3,102	6
8	1,468	1,636	1,805	1,937	2,142	4
9	2,516	2,684	2,852	3,021	3,189	7

Table 15

Sensitivity Analysis of the Various Alternatives

Advanced Training - A sensitivity analysis for advanced C
School training requirements yields the same type of results
as that for Class A shown above: The total costs vary with
the amount required but the rank order remains essentially
the same. Increasingly sophisticated technical training can
probably not be taught as well by correspondence, but such
a limitation is recognized in section 5 by rating as Inade-
quate all alternatives (2, 5 and 8) which rely on training
to the exclusion of resident Class C Schools.

III. Other Points to Consider

There are also some nonmonetary and nonquantifiable
points to be considered when comparing Resident to Corres-
pondent training. Among these are risks involved in relying
too heavily on one method or the other. Additionally, losses
in other areas such as morale, professionalism, perceived
opportunity or tradition may be caused by a change in train-
ing options open to the individual.

A. Risks

1. Abolishing Schools: Any decision to abolish
already existing Class A or C Schools as an economy measure
could have negative effects if reversal of such a decision
becomes necessary. Reestablishing billets would require at
least two years and building up a school from mothballs,
including hardware, software and organization would take
another year or two. All together, a period of at least
three years would be required to get a School back to pro-
ducing capability. If a shortage of trained personnel can
not be identified at least three years in advance, a short-
fall may result.

2. Loss of input control: Abolishing a Class A
School under the assumption that all former A Students will
now choose to take out a Correspondence Course may be an
incorrect assumption. They may choose to take a course for
another Rate, causing uncontrolled fluctuation in MK3 out-
put.

B. Nonquantifiables

1. A resident school, either A or C provides an
opportunity for standard training requirements for all stu-
dents under identical conditions. Correspondence training
combined with the "Practical Factors" requirement to be
evaluated by the unit may lead to unequal standards being
applied at various units.

2. Abolishing Class A Schools may lead to decreased
identification with Rate and decreased pride in work. There
is a sense of comradeship and Rate identification that comes
with being a Graduate of the same School as all your fellow
Machinists or Radarmen. This is lost in a Correspondence
training environment.

·3. Some future technological developments may prove
to be of a nature that makes Correspondence training impossi-
ble. If this is the case, the lest costly Correspondence
route may prove unworkable.

4. Opportunity - The military is seen as an opportunity
for advancement and training of the individual, a place where
skills and growth can be achieved that will benefit the
individual either inside or outside the service. To the
potential recruit, an opportunity to attend a Class A School
and acquire a skill is an inducement to enlist. To the
individual already in the Coast Guard, the availability of
the correspondence route to advancement leads to the percep-
tion of opportunity; the idea that no matter where he is,
he need only apply to be put on the road to advancement.

Additionally, people assigned to the field after Recruit

Training are motivated to demonstrate their promotion poten-

tial in order to receive a favorable endorsement on an

application for Class A School.

IV. Recommendations for Machinist Training

Any discussion of recommendations must be prefaced with

a warning: Don't throw the baby out with the bath water.

The present system does work and provdes a wide variety of

training to the Coast Guard at a very reasonable cost.

Recommendations at most will be fine tuning adjustments

to an already efficient piece of equipment.

A. Selection of Alternatives

After examining the data and evaluating the strengths

and weaknesses of the various alternatives, I recommend

alternative 9 (utilizing both A School and Correspondence

for initial training and both C School and Correspondence

for post entry training) as the first choice with alterna-

tives 7, 1, 3, 4, and 6 following in order of recommendation

and alternatives 2, 5 and 8 eliminated. The main reason that

alternative 9 is recommended, despite its comparatively high

cost, is that it provides flexibility of either Resident of

Correspondent training at all career levels depending on

training needed. It is the only alternative that provides

this option. Alternatives 7, 1 and 3 all retained Class A

School but eliminated the Correspondence Courses at some

point. Alternatives 4 and 6 are very inexpensive, costing

roughly half what the next costly alternative does, but there is a high risk since alternative 4 and 6 both eliminate the A School and rely entirely on Correspondence Course Graduates. During FY 78 roughly 85% of new Third Class Machinist Mates were A School Graduates and 15% had taken the Correspondence route. To assume that all or even most of the 85% would choose the MK Rate by Correspondence would be tenuous. Alternatives 4 and 6 are recommended last, despite their apparent economy and possibly might not be recommended at all without some added control as to Rate entry made available to people through Correspondence.

B. Keep Resident Schools Short

As shown in Appendix VI, over 50% of the total cost of graduating a man from MK A School is the salary of the individual. Less than 25% is the actual cost of the School and Instructors. Since student salary cost is a linear function of school duration, it is recommended that any shortening of resident training possible be considered. Where material might be delivered with equal effect by Correspondence, it should be eliminated from Resident School and included in the appropriate Correspondence Course.

C. Enroll Applicants As Early As Possible

Training cost is an investment by the organization in the skills of the individual. The return on invesment is in the form of work performed after training that the individual would not have done without the training. We forefit

that investment when enrollment is delayed by waiting lists.

Example:

> A man graduates from eight weeks of Recruit
> Training and goes directly to MK A School,
> graduating sixteen weeks later. Cost to the
> Coast Guard is about $3,300. Time remaining on
> active duty (4 year enlistment less 8 weeks,
> less 16 weeks) is 3 1/2 years. Training investment
> amortized over reamining enlistment ($3,276.20 ÷ 3.5)
> is about $936 per year or $18 per week.

> If our example had not gone directly from Recruit
> Training to MK A School, but had instead gone
> to the field, applied for MK A School and finally
> enrolled with only the minimum time required
> remaining on his enlistment, our investment of
> $3,300 would now be amortized over 22 months
> (the minimum for an A School of 16 weeks dura-
> tion is 28 months obligation upon the convening
> date of the class, less 16 weeks = 22 months)
> for a cost of $1,787 per year or $37 per week.

This difference of about $850 (maximum) in amortized

training expense per man per year becomes increasingly signi-

ficant during periods of low retention and high turnover, when

heavy training loads are required to maintain skill levels.

The best way to minimize this cost is to keep A School wait-

ing lists short. A long waiting list simply wastes a part

of an individuals enlistment in unskilled work, reducing his

more productive months after A School graduation. If minimum

standards for A School were raised, waiting lists would be

shortened and A School graduates would have a longer time

remaining on their enlistments, serving as skilled Petty

Officers.

Of course, there are drawbacks to making Recruit

graduation the only time an individual may be enrolled in an

A School. He will be green when he graduates, never having

been aboard a regular unit. This would emphasize importance

of performance on the Basic Battery of tests discussed on

page 22, meaning that individuals who arrived at Recruit

Training with poor reading or test taking skills would

quickly find themselves at a hige disadvantage in terms of

promotion. Those who are not selected would lose a big

opportunity for advancement and, unless they are motivated

to complete a Correspondence Course, would serve in menial,

unskilled jobs for the remainder of their enlistment.

D.   Do Not Do Away With A Schools

Based on strictly cost data alone, there may be a

temptation to simply do away with A Schools where the

material can be taught through Correspondence. However,

as discussed on page 18, the A Schools produce the vast

majority of graduates when both routes to promotion are

made available to the individual.

A Schools are expensive (by comparison) but they

have the advantage of being able to deliver large quantities

of thoroughly trained people in a short time frame.

V.   Conclusions To Chapter 3

What I have attempted to show here is the real cost of

Enlisted training in the Coast Guard on both an individual

and overall basis. Training costs have been calculated

under 1978 conditions and estimates of alternative methods

of training delivery have been made. After a comparison of

these costs and discussion of non-quantifiables, I have

recommended the method that provides the most flexibility

even though (on paper) it is not the least costly. Despite

the comparatively high cost of A School training, I have

recommended we not attempt to completely replace A Schools

with Correspondence Courses. A Schools produce graduates

in numbers unmatched by Correspondence Courses.

By way of conclusion it should be recalled that there

are several variables left unaddressed here. Among these

areas needing further research are quality of output of the

various training methods, performance after graduation,

reenlistment rates of graduates from various training sources,

the effect of literacy skills on promotion and effects of

the A School selection process.

Chapter 4.   A MORE GENERAL MODEL FOR SELECTING
RESIDENT VS. CORRESPONDENT TRAINING

By examining the workings of a training system that offers
two alternative methods of training delivery, I have shown
the advantages and disadvantages of each under various con-
ditions of technological sophistication, load levels, con-
trol and others.   Any decision as to which method is "better"
under a given set of circumstances should first take into
account the eight inputs I have identified below.

I.   Inputs To The Model

   A.   Control of Quotas and Output

       Where a certain number of trained personnel are re-
quired at a given time, a Resident School is clearly pre-
ferred to a Correspondence Course.   Assuming that there
are an adequate number of qualified applicants, planning the
number of graduates is comparatively certain and simple to
calculate.   A resident course with a historical completion
rate of 90% and 16 weeks duration will probably produce that
same output predictably.   If 90 graduates are needed in
April, 100 quotas can be issued for a class convening in
January with a high probability that the quotas issued will
fill the need.   There is no similar procedure for Corres-
pondence training.   Since an individual enrolls in a Corres-
pondence Course out of his own desire for promotion, and
progresses based on his own motivation, there is no way to

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control output by manipulating enrollment as there is in a resident environment.

B. Control of Performance

In a resident environment, the instructor can observe the performance of each student, both on written tests and practical hands-on performance. In a correspondence situation, written material can be evaluated but observation of practical perofrmance is left to the immediate supervisor at the unit. This could lead to varying standards being applied by different supervisors and less control of performance. Where direct Instructor supervision is required, resident training has the advantage.

C. Control of Progress

A resident course provides an environment in which Instructors set the pace of learning and the student must either keep up or fail. Progress can be controlled by the instructore and the graduation date can be anticipated ahead of time. This is not the case in a correspondence course. Since the students progress is a function of his own motivation, there is no telling when a group of correspondence students will become graduates, capable of performing at the level needed. Correspondence students can be disenrolled for lack of progress, but the control is still not as strong as a resident training environment.

D. Number of Students

A correspondence course has a high fixed cost in course development but a small variable cost in terms of

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each additional student. Preparing a Correspondence Course
for only fifteen or twenty people per year requires almost
as much work as for fifteen hundred people per year. Where
the number of people needing training is small or infrequent,
getting a resident class together with a qualified instruc-
tor makes more sense than trying to maintain a Correspondence
Course.

E. Cost

As stated above, the biggest cost of correspondence
training is fixed while the biggest cost of resident train-
ing (student salary) varies with the number of students and
length of the course. With the example shown in this Thesis,
the cost of the correspondence method of training was about
$80 per graduate while the resident method cost almost
$3,300 per graduate.

However, this difference pales when we consider
amortization of costs and alternative sources. An initial
investment of $3,300 sounds like a large sum but when amor-
tized over the remaining enlistment, the weekly cost comes
to between $18 and $37 per week, depending on obligated
enlistment remaining. A weekly salary (including allowances)
of an E-4 in 1978 was $165. When added to the amortized
training investment, that man costs the Coast Guard between
$183 and $202 per week, still below what we would have to
pay to acquire the same technical skill from our alternative
source of skilled manpower - the civilian labor market.

Correspondence training requires a much smaller initial investment in the individual on the part of the organization. However, when the larger investment of resident training is amortized over the productive period of the individual, the difference in cost decreases and makes resident training appear less expensive than it might originally appear.

F. Nature of Material: Theoretical vs. Hands On

Some types of material can be taught in either a resident or correspondent mode while others require hands on supervision with an instructor present. Practical skills associated with aviation, health care or electronics do not lend themselves to correspondence training. In situations such as these, there is no sbustitute for the type of hands on experience provided in a resident environment. Theoretical, administrative or conceptual information can often be delivered easily by correspondence. Skills associated with clerical or "paper" oriented jobs lend themselves to the correspondence mode.

G. Level of Difficulty

Some material is new to the student but of moderate level of difficulty, permitting individual learning without the presence of an Instructor. Other material is sufficiently difficult as to make learning less likely without the benefits of having an Instructor present to answer questions and assist the student.

H.   Literacy and Study Skills

In addition to self motivation, the correspondence student must be able to read printed material and retain information easily. Any difficulty in reading, writing or learning will be a big obstacle to learning in a correspondence mode. Face-to-face classroom instruction does not rely as heavily on reading skills, giving Resident training an advantage when reading or study skills are marginal.

II.   The Training Delivery Selection Model

Utilization of the eight points listed above produces a model which might be used in determining whether Correspondent or Resident training is the best training mode in a given situation. The model permits assigning relative importance to the various points to aid in the selection of training mode. After using the model a few times, it becomes obvious that the normal desire to minimize cost must be reconciled with the desire to maximize the seven other points listed. The model is portrayed as Table 16 below.

To use the model, consider the eight points listed and place a check mark on the continuum between "more important" and "less important" (or other adjectives listed) so as to indicate the relative position on the scale which represents the situation being considered. A general cluster of check marks towards one side of the scale is an indication of the preferred training method in a given environment.

1. Control of Quotas ————— More important* ____ * ____ * ____ * ____ * Less important

How important is control over the number of graduates and the date of completion? Does the operational job for which people are being trained require a fixed number of trained personnel by a given date or is the system able to employ new trainees whenever they complete training with shortfalls made up from some other source?

2. Control of Performance ————— More important* ____ * ____ * ____ * ____ * Less important

How important is tight control over the level of performance of the trainee? Does the task require individual examination and observation of each individual by some central examination or certification unit or is compliance with promulgated standards to be checked in the field adequate?

3. Control of Progress ————— More important* ____ * ____ * ____ * ____ * Less important

How long can the organization wait for a student to complete training? Can the organization wait while the student works part time on a Correspondence Course or is the need for rapid progress so strong as to justify full time effort in a resident environment?

4. Students per year ————— Few (<20)* ____ * ____ * ____ * ____ * Many (>200)

Will there be enough students to justify the large initial outlay for development of a Correspondence Course or will the student load be so small as to make it easier to offer a Resident Course once a year as required? Will the large initial investment and fixed cost of Correspondence Course development provide a long run savings over Resident Training with its high variable cost of student salary?

5. Cost minimization ————— Less important* ____ * ____ * ____ * ____ * More important

What can the organization afford to spend per student? Does the organization have the cash flow required to invest in full time resident training during which period the employee will not be producing for the organization? Can the training budget support the high cost of resident training or is cost minimization more important?

6. Nature of Material ————— Hands on* ____ * ____ * ____ * ____ * Theoretical

Does the material require hands on practical experience under an Instructors supervision or is the material of a theoretical nature requiring more reading than doing?

7. Level of Difficulty ————— More difficult* ____ * ____ * ____ * ____ * Less difficult

Is the material too difficult for the students to learn without the assistance of an Instructor or are they able to learn the material themselves by individual reading and study?

8. Literacy and Study Skills ————— Low* ____ * ____ * ____ * ____ * High

Do the students have the literacy and study skills necessary for using a correspondence course or will literacy and language handicaps require so much effort to overcome as to make learning difficult without the presence of an Instructor in a resident environment?

Preferred Method of Training Delivery ————— Resident* ____ * ____ * ____ * ____ * Correspondent

TABLE 16

A. A grouping towards the left - A general grouping of check marks towards the left with a mean of 3.5 or more indicates that the environment requires control of a reliable output of personnel fully trained in a technical skill. A training requirement such as this can only be handled with resident training and will require the added expenses associated with resident training.

B. A grouping towards the right - A general grouping of checkmarks towards the right with a mean of 2.5 or less indicates the feasibility of less expensive Correspondence training. This would be a training environment where tight control over student progress or output of graduates is less important and where the studnets have solid literacy skills.

C. A grouping to the left with cost to the right - In this situation, the planner is trying to do more than his budget will allow. There is no way to maintain tight control over output and teach difficult technical material without the investment required by resident training. In this situation, the manager must either reassess his need for trained personnel or realize that he must budget at a higher level.

D. A scatter - A scatter of check marks across the scales or a mean between 2.5 and 3.5 does not give a conclusive answer. It probably indicates either: Inconclusive results and a need to better define priorities between cost,

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control, nature of material, etc.. Or the scatter could

indicate an environment in which correspondent training could

not be completely effective but where the extra costs

associated with Resident training is only barely justified.

As a first try to sorting out a scatter, examine items 4

(students per year) and 8 (literacy and study skills).

Are these two items ckecked in the 1 or 2 range with the

other six items higher? If so, this would indicate that

there would be a large enough student load to make a

Correspondence Course economical and that the students have

the literacy and study skills required but that there is a

need for tight control of the number of fully qualified

graduates. A Correspondence Course might be feasible in

this situation in terms of students being able to learn the

material but it could not guarantee the number of graduates

required within a given time frame as a Resident Course

could.

E. Two Methods of Interpreting Results

As discussed in Sections A-D above, there are two ways

of interpreting the model: mean and pattern (scatter of

checks). Both methods are usable but each provides somewhat

different data.

Use of the mean provides a rule of thumb for making

initial judgements. A mean score of less than 2.5 on the

eight inputs listed is an indication of a trend towards

Correspondence as the best method. Mean scores between 2.5

and 3.5 are inconclusive and do not offer either method as

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clearly superior. A mean score above 3.5 is an indication
that Resident Training is probably necessary.

Once the mean has been determined, the scatter of
checks can be examined to provide more specific information
as to exactly which inputs are causing the mean to be what
it is. If the three Control Inputs (Quotas, Performance
and Progress) are towards the left of the mean, this reveals
why a high score was obtained: Because the trainer (or
planner) feels he needs tight control. If "Nature of
Material" and "Level of "Difficulty" are to the left of the
mean, this would indicate that the nature of the material
to be trained is keeping the mean score high.

Both approaches may be used in interpreting the
results of the model. The simple mean provides an initial
recommendation. Examination of the pattern or scatter pro-
vides additional and more specific information.

III. A Demonstration of the Model

In the previous sections, I discussed my model for aiding
the decision maker in selecting which form of training
would best suit his needs in a given situation. I listed
eight inputs to consider in the decision. By way of example,
I will work through this model for three Rates within the
Coast Guard at the Third Class Petty Officer Level.

A. The Machinist Rate (MK)

The MK Rate has been discussed in Chapters 1, 2 and
3. It involves between 600 and 800 new trainees per year
to perform basic maintenance and repair on gasoline and

diesel engines under the supervision of a more sneior Petty

Officer. The MK Rate includes about 3750 personnel.

Using the Training Delivery Selection Chart shown

in Table 16 I have assigned the following evaluation to the

MK3 Resident/Correspondent Training Decision: The completed

Selection Chart appears as Appendix XII.

1. Control of Quotas ----------------------- 5
A reliable flow of MK3s must be available to the field
to maintain Coast Guard owned equipment.

2. Control of Performance -------------------- 3
A reasonable uniformity of skill level must be expected
but a field supervisor should be able to insure com-
pliance with promulgated standards.

3. Control of Progress ---------------------- 4
The organization can not wait too long for graduates.
There is a need for trained personnel and an undue
delay in progress would be harmful.

4. Students Per Year ------------------------- 1
The MK Rate requires between 600 and 800 new entrants
per year.

5. Cost Minimization ------------------------- 3
There is always a desire to minimize cost. In this
case, it is probably not extremely high or low. We
must be willing to invest in decent training for
reliable maintenance of our equipment but something
as routine as diesel and gasoline engines should not
be too expensive.

6. Nature of Material: Hands On vs. Theory -- 5
Practical experience is the only way to learn the
practical skills required of an MK3.

7. Level of Difficulty ----------------------- 4
The material is not so difficult as to be impossible
to grasp without an Instructor but to someone
unfamiliar with the subject, a resident environment
would be a help.

8. Literacy and Study Skills ---------------- 3
Average.

Mean Score for MK 3 training ----------------------- 3.5

Interpretation - MK training is a borderline case
which tends to fall towards the middle of the chart but is
still far enough towards the left to justify a Resident
Course. As shown in Appendix XII, there is a wide scatter
of check marks on the eight inputs. Control of quotas is
needed to insure that a reliable flow of personnel are
trained in the hands on, practical skills necessary. How-
ever, performance can be controlled adequately by practical
factor completion in the field and OJT. There is a student
load large enough to justify a Correspondence Course. The
problem with relying completely on a Correspondence Course
is shown in items 1 and 3, Control of Quotas (5, more impor-
tant) and Control of Progress (4, one below more important).
Without these two high scores, MK training would average
3.16 on the chart, much closer to the middle of the scale.
The distribution of the scores indicates that a Correspon-
dence Course is <u>feasible</u> as a means of delivering the train-
ing needed to become an MK3 but that a high degree of control
over the number of quotas filled and progress of the student
is needed. This control can be provided only in a Resident
environment. A Correspondence Course may be used as an
economical way to supplement Resident School output but
the Resident Class A School should not be closed as an
economy move.

    B. The Boatswain's Mate Rate (BM)

        As a second demonstration of the Training Delivery
Selection Model, I will use the BM Rate. The BM Rate includes

over 3000 people and requires roughly 700 rate entrants
per year. BMs are responsible for maintenance and operation
of deck equipment. BMs must learn about boat handling,
navigation, seamanship and vessel maintenance.

Using the Training Delivery Selection Chart in
Table 16 I have assigned the following evaluation to the
BM3 Resident/Correspondent Training Decision: The completed
Selection Chart appears as Appendix XIII.

1. Control of Quotas ------------------------ 2
Until recently, the Coast Guard was able to rely on the
BM3 Correspondence Course to fill vacancies. There
was not a need for close control of quotas and new
BM3s were placed in billets after completion of the
Correspondence route to advancement.

2. Control of Performance -------------------- 2
OJT and completion of Practical Factors under an
experienced supervisor is adequate control of
performance.

3. Control of Progress ---------------------- 1
The BM Rate requires extensive OJT. Within reasonable
limits, the Coast Guard can wait while a man gains
practical seamanship skills on the job.

4. Students Per Year ------------------------ 1
There are enough new BM3s to justify a Correspondence
Course (over 700 per year).

5. Cost Minimization ------------------------ 2
The BM Rate should not require expensive technical
training. For a group this large, some minimization
of cost per student must be sought.

6. Nature of Material ----------------------- 4
The BM Rate is a hands on, practically oriented Rate
where experience and OJT are the best teachers.

7. Level of Difficulty ---------------------- 2
The material is not difficult and requires more
experience than study

8. Literacy and Study Skills ---------------- 3
Average.

Mean Score for BM3 Training ----------------------- 2.0

Interpretation - The BM3 training requirements lend themselves to Correspondence Training. As shown in Appendix XIII, the scatter is skewed to the right with only two inputs checked above the score of two. The model indicates that the material is not difficult and is acquired best through experience on the job. Control of performance can be handled adequately by completion of practical factors. Until recently, control of quotas and student progress was not a problem. It is interesting to note that for many years, BM was the only Rate with no A School; all BMs were Correspondence Course Graduates. However, a drop in reen-listment rates during recent years has led to a shortage of BMs and the new trainees were not completing the Correspondence Course in numbers large enough to fill all vacancies. As a result, the Coast Guard has initiated a BM A School to graduate about 300 new BMs per year.

C. The Aviation Electronics Technician Rate (AT)

As a final demonstration of the Training Delivery Selection Model and Chart, I will use the AT Rate. The AT Rate has an allowance of over 600 billets. An annual input of approximately 140 people is required to maintain billet strength (recent shortages will increase the number of entrants needed in the short run). ATs are responsible for maintenance and operation of avionic (electronic) equipment used aboard Coast Guard aircraft for navigation, flight operation, communications and safety.

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Using the Training Delivery Selection Chart in Table
I have assigned the following evaluation to the AT3 Resident/
Correspondent Training Decision: The completed Selection
Chart appears as Appendix XIV.

    1.   Control of Quotas ----------------------------- 5
Control of quotas is important. A shortage of trained
personnel leads to aircraft flying with unreliable
equipment. A reliable flow of graduates is required.

    2.   Control of Performance ----------------------- 5
Avionics must be maintained in accordance with set
standards. Each student must be individually certified
as meeting a given level of performance. There is no
room for variability in training requirements or
reliance on OJT.

    3.   Control of Progress -------------------------- 4
To the extent that a reliable source of graduates is
needed, trainees can not spend too long in training.
There is a lot of material to be learned and a man
will have little time remaining on his enlistment
if his progress is too slow.

    4.   Students Per Year ---------------------------- 2
There are almost enough new ATs each year (140) to
justify maintenance of a Correspondence Course.

    5.   Cost Minimization ---------------------------- 4
Maintenance of aircraft electrical systems is not a place
to cut costs. Adequate training will be expensive and
the Coast Guard must be willing to pay the price.

    6.   Nature of Material --------------------------- 5
Repair of electronic equipment requires hands on
practical experience in the presence of an Instructor.

    7.   Level of Difficulty -------------------------- 5
Electronics is a difficult subject for a student to learn
without the help of an Instructor. Math, logic, physics
and practical skills are too difficult to learn by
Correspondence.

    8.   Literacy and Study Skills ------------------- 2
ATs are required to have above average scores on aptitude
tests measuring both language and arithmetic ability.

Mean Score for AT3 Training ----------------------------- 4.0

Interpretation - As the pattern of check marks in Appendix XIV indicates, AT training requires a reliable flow of trained personnel with practical experience in a difficult area. There are a comparatively small number of people trained each year and avionic maintenance training is not a place to be cutting costs. These inputs show a need for a Resident Course over a Correspondent Course. A basic Correspondent Electronics Course might help to shorten the Resident Course (presently 28 weeks) but the idea of qualifying people to maintain avionic systems without Resident Training is unfeasible.

IV. Conclusions to Chapter 4

In the Chapter, I have developed a Model to help a decision maker select which training method, Resident or Correspondent would best fit his training needs. I have included a Chart to assist in the use of the Model and three examples to demonstrate the use of the Model.

As with any decision makeing Model, it produces an aid, not an answer. By considering the eight inputs discussed, the decision maker can be guided to weigh the various aspects to be considered. The final average of the inputs will indicate a trend toward one method or the other.

There are some cautionary notes to consider: There will always be an inclination to select Correspondence Training because of its lower cost. However, course completion rates are often low or unpredictable for Correspondence

Training. Where there is a need for tight control over
quotas, student performance and student progress, only a
Resident Course will suffice.

CHAPTER 5. CONCLUSIONS

This Thesis has examined Resident and Correspondent Training for Coast Guard Enlisted Personnel. The areas of training management, deficit forecasting, quota allocation and costs of training were examined. Resident and Correspondent Training each have their strengths and weaknesses. Resident Training is more easily controlled in terms of number of graduates, time required for training and close supervision of Student performance in a hands on environment. Correspondent Training, when paired with organized OJT and demonstration of practical performance (practical factors) provides very inexpensive training to large numbers of people in a real world environment.

A general model to aid in selecting between Resident and Correspondent Training was developed. By considering the eight factors listed, a decision can be reached regarding which method is preferred in a given situation.

I. Further Research

In the course of this Thesis, many topics worthy of further research have been addressed only briefly. Further graduate research may consider some of these questions or perhaps those having cognizance over these areas may consider answers to these questions:

A. Quality of Output - Do A Schools and Correspondence Courses provide equal training or is one method superior to

the other? Holding confounding variables constant, can we measure a difference between Resident and Correspondent Training within the Coast Guard in terms of: Performance? Reenlistment? Morale? Promotion? Etc. Resident training is expensive but does the Coast Guard get anything in addition to reliability of numbers of graduates for the extra investment?

B. Increased output of Correspondence Course Graduates - As discussed on pages 18-19, in the nine rates where the Resident/Correspondent option is offered, only 15% of the Third Class Petty Officers came from the correspondence system. Considering that fully 2.3% of the Coast Guard Enlisted Corps is enrolled in these nine A Schools at a given time, this represents a huge expense in Resident Training when comparable Correspondent Training is available. If people could be motivated to enroll in Correspondence Courses and complete them rapidly, this would represent a savings to the Coast Guard of several million dollars (717 man years per year x annual salary of an E-2 of $5499 = $3.9 million) annually! Perhaps this is the area most worthy of further research: How can we motivate our personnel to enroll in and complete Correspondence Courses and save this annual cost of Resident Training.

C. Refinement of the Model - How valid is the Training Delivery Selection Model? Does it serve the decision maker as well as I hope it will? How can the decision maker better compare cost, control and other inputs? What is the break

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even point in terms of number of students per year? Does it pay to develop a Correspondence Course for 20 students per year? 100? 200? Even if the model indicates that Correspondence Training is feasible, how can the decision maker predict how many people will complete the Correspondence Course?

D. Explicit Designs for Alternatives - Of the nine alternatives listed in this Thesis, I recommend the one that offered both Resident and Correspondent Training at both the entry and post-entry level. But what of the other eight alternatives? What might be some of designs for implementing them, especially the six which are less costly? Special attention might also be given to finding a feasible way of implementing Alternative number 6 since this is the one that would have Correspondence Courses replace A Schools in the nine Rates where both methods of advancement are offered (discussed in Section B above).

E. Effects of Literacy on Promotion - Are our Correspondence Courses written in a form that matches the literacy level of our Correspondence students? Is reading ability a problem for our people? How successful have Coast Guard efforts been in identifying and assisting people needing reading and study skill improvement?

F. Other Areas for Research - How accurate has the Coast Guard been in forecasting manpower and training needs? What are our priorities in training? What is the

best method of teaching technical skills? How can we retain our skilled Petty Officers? What are the developmental costs involved in Resident and Correspondent Training?

II. Motivation

This Thesis has examined costs of training; something relatively easy to measure. While I was able to indicate the least costly methods, I was not able to answer the big question: How do we get students to choose the least costly method? The answer to this problem is not one of dollars, but of <u>motivation</u>. Selecting the least expensive method is easy. The difficult final problem ends up being not one of just cost or mangement of training but of <u>people</u> and finding ways to <u>motivate</u> <u>them</u>.

III. The Final Comparison

I have compared Correspondent and Resident Training from the point of cost and discussed some of the other grounds for comparison. I have brought out some of the strengths and weaknesses of each method: Control, Cost, Level of difficulty etc. The objectives of both methods are basically the same: To provide trained personnel to meet the needs of the organization at a minimum cost in a given environment. Getting the maximum output for the investment involves both an understanding of and proper application of both methods.

THE COAST GUARD ENLISTED PROMOTION SYSTEM

Enlisted Rank	Title
E-1	Seaman Recruit
E-2	Seaman Apprentice
E-3	Seaman
E-4	Third Class Petty Officer i.e. Third Class Machinist
E-5	Second Class Petty Officer i.e. Second Class Machinist
E-6	First Class Petty Officer i.e. First Class Machinist
E-7	Chief Petty Officer i.e. Chief Machinist
E-8	Senior Chief Petty Officer i.e. Senior Chief Machinist
E-9	Master Chief Petty Officer i.e. Master Chief Machinist

Enlisted Rank	Normal Duties	Average Time In Service For Promotion
E-1	Recruit Training	
E-2	Petty Officer Training or Menial Work	.17 years
E-3	Petty Officer Training or General Work	1.15
E-4	Technical Work	1.76
E-5	Technical Work and Supervision	3.33
E-6	Technical Work Supervision and Leadership	6.25
E-7	General Supervision and Leadership	11.83
E-8	General Leadership and Administration	17.00
E-9	General Leadership and Administration	20.08

NON-PRIOR SERVICE PERSONNEL BY YEARS OF SERVICE AS OF
9/30/75, 9/30/76, 9/30/77, 9/30/78

Inventory Table

FY	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12
75	5775	5147	3255	3459	1088	782	663	437	419	330	238	214
76	5626	4962	4810	3056	1152	745	719	604	409	408	299	227
77	5498	4795	4637	4425	1065	830	676	629	551	378	353	271
78	5209	4614	4510	4413	1542	821	774	586	539	517	331	322

12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23
225	257	348	368	340	233	388	403	287	68	32
200	211	242	330	345	329	223	375	252	166	49
213	180	198	230	312	328	314	216	195	121	114
258	197	167	185	217	299	319	312	130	115	73

23-24	24-25	25-26	26-27	27-28	28-29	29-30	30+	Total	Growth
22	20	8	6	10	6	1	4	24829	-
25	15	13	7	5	5	5	3	25814	.038
32	15	14	6	5	4	4	7	26609	.029
88	13	13	12	4	3	3	8	26596	-.004

Appendix II shows the number of nonprior service
personnel on active duty by years of experience.
As of 9/30/75, there were 5,775 (nonprior service)
people on duty with less than one years experience,
5,147 with between one and two years, etc.

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NON-PRIOR SERVICE PERSONNEL BY YEARS OF SERVICE

Retention Table

FY	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11
75 to 76	85.9	93.5	93.9	33.3	68.5	91.9	91.1	93.6	97.4	90.6	95.4
76 to 77	85.2	93.5	92.0	34.8	72.0	90.7	87.5	91.2	92.4	86.5	90.6
77 to 78	83.9	94.1	95.1	34.8	77.1	93.3	86.7	93.8	87.6	87.6	91.2
Combined	85.0	93.6	93.6	34.4	72.5	92.0	88.4	89.8	94.5	88.1	92.1

	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22
	93.5	93.8	94.2	94.8	93.8	96.8	95.7	96.6	62.5	57.8	72.1
	93.8	90.0	93.8	95.0	94.5	95.1	95.4	96.9	52.0	48.0	68.7
	95.2	92.5	92.8	93.4	94.3	95.8	97.3	99.4	60.2	59.0	60.3
	94.2	92.2	93.7	94.5	94.2	95.9	96.2	97.6	58.0	54.8	66.5

	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30
	78.1	68.2	65.0	87.5	83.3	50.0	83.3	99.9
	65.3	60.0	93.3	46.2	71.4	80.0	80.0	80.0
	77.2	71.9	86.7	85.7	66.7	60.0	75.0	99.9
	74.4	67.1	80.0	71.4	73.7	60.0	80.0	85.0

Appendix III shows retention rate as a percentage of total (nonprior service) Enlisted Corps by years of service. Between the beginning of FY 75 and the beginning of FY 76, 85.9% of those with less than 1 years experience remained on active duty while the remainder left for a variety of reasons. During that same period, 93.5% of those with between 1 and 2 years remained on active duty, etc.

APPENDIX IV

SEPARATIONS

YEAR	TOTAL SEPARATIONS	TOTAL SERVICE SIZE	GROWTH OF TOTAL SEPARATIONS	SEPARATIONS AS A % OF TOTAL SERVICE
1976	4922	31601		15.5
1977	5393	32031	.087	16.8
1978	5613	31440	.039	17.8

Appendix IV shows Separations during the period 1976-1978 and Separations as a percent of total Service.

APPENDIX V

ROUTES TO PROMOTION IN VARIOUS RATES

RATE	Promotion to PO3 From Correspondence Route	Anticipated Promotion to PO3 from Class A Graduation	Correspondence As % of Total Promotions to PO3	Course Length	Man Years Spent In Training
DC	64	219	22.6	15	63.75
EM	21	266	7.3	17	13.62
GM	10	69	12.7	16	21.85
MK	137	834	14.1	16	263.39
QM	20	209	8.7	13	48.47
RD	2	77	2.6	18	20.87
SK	20	337	5.6	10	79.39
SS	57	255	18.3	13	67.75
YN	99	431	18.7	14	138.31
Total	430	2,697	13.8		717.4

COST OF GRADUATING EACH INDIVIDUAL FROM MK A SCHOOL

Instructor Costs

Authorized Billet	Number Authorized	Base Pay	BAS	BAQ	Total	
CWO4	1	1,512.90	59.53	290.70	22,357.56	
MKCM	1	1,249.80	90.00	255.60	19,144.80	
MKCS	1	1,044.90	90.00	236.40	16,455.60	
MKC	5	837.30	90.00	219.90	68,832.00	
EMC	1	837.30	90.00	219.90	13,766.40	
MKI	13	696.00	90.00	202.20	154,159.20	
EMI	1	696.00	90.00	202.20	11,858.40	
MK2	7	568.20	90.00	185.70	70,887.60	
MK3	5	478.50	90.00	163.50	43,920.00	
					421,381.56	421,381.56

Support

CDR	1	1,932.30	59.53	338.10	27,959.16	
LCDR	1	1,537.50	59.53	301.80	22,785.98	
YN2	1	568.20	90.00	185.70	10,126.80	
GS-4	1				10,090.00	
					70,961.92	

ENG School has 53 instructors of whom 34 (64%)
  are assigned to the A School Staff   x.64

                                                  45,415.62   45,415.62

Operating Costs

                                      214,843.14

                                            x.64

                                    137,499.61   137,499.61

      Total Fixed Costs   604,296.79

          Number of Graduates (FY 79) = 644   ÷644

      Fixed Cost Per Graduate   938.35

Student Salary
    E-2 Base Pay = 443.10 x 4 months   1,772.40

Travel Cost
    Average Travel Cost   565.46

      TOTAL COST PER GRADUATE $3,276.21

Appendix VI derives the cost of sending an individual to
MKA School. The authorized billet strength is shown with pay
scales calculatd based on average longevity for the rank shown.
Support is calculated in the same manner and allocated based
on the per cent of the MKA staff as part of the Engineering
School. Operating costs derived from Coast Guard records are
allocated in the same manner. Travel costs are based on Coast
Guard records of average cost to Yorktown, VA.

APPENDIX VII

COST OF CORRESPONDENCE TRAINING

Cost Per Graduate:

Cost Per Course Development	$25,900	
Amortization period	÷ 6 years	
Course development cost/year	6,475	$6,475

Servicewide Exam Development	137,500	
Number of Exams	÷ 86	
	1,599	1,500

Exam Administration	30,200	
	÷ 86	
	351	351

Fixed Cost of Operating Coast Guard Institute
Allocated to Each Course Per Year (Average)   8,425

Total number of graduates = 16,086 per year
                              ÷ 86 exams
Average students/course   187

Fixed Cost per Course = $8,425
                          ÷187 Average graduate/course
Fixed Cost Per Graduate   45.05

        28,037 Enrollments produces 16,086 Graduates
Therefore 1.74 Enrollments produced each 1 Graduate

Variable Admin Costs = $19 Per Enrollment
                         x 1.74
Variable Admin Cost
Per Graduate   33.06
Fixed Cost Per Graduate   45.05

Total Cost Per Gradute   78.11

Cost of Servicewide Exam per Graduate:
        Exam Development   137,500
        Exam Administration 30,200
                            167,700 Total Exam Costs
                            ÷16,086 Number of Graduates
                            $10.43 Per Graduate for Service-
                                    wide Exam

Total Cost per graduate   78.11
Less cost for Servicewide Exam 10.43
Cost for training/graduate   67.68

Appendix VII shows cost of Correspondence training. The largest cost shown for each course is the development of new courses at roughly $6,475 per course, per year. Servicewide Exam costs have been divided by the number of exams to give a cost of almost $1,600 per Servicewide Exam (for each course). Exam administration has been calculated in the same manner at $351 for a fixed cost of $8,425 per year to maintain a given course on the shelf. An average number of graduates of 187 students per year produces a fixed cost per graduate of $45.

The cost per enrollment is $19 but it takes 1.74 enrollments to produce 1 graduate, making the variable cost per graduate $33.

The total cost for both training and Servicewide Exams is shown at the bottom.

APPENDIX VIII

COST OF C SCHOOL

Cost of A School Per Graduate	$3,276.21
Approximate ratio of required C School career costs to A School costs based on one person with 20 year career	x 1.5
	$4,914.32

Cost per year based on 16 years remaining in 20 year career after first four year enlistment	4,914.32 ÷ 16
	$ 307.14

Cost per promotion based on 5 promotions (E-5,6,7,8,9) given that an individual will make if he attains the highest enlisted rank (actually few do)	4,914.32 ÷ 5
	$ 982.86

Appendix VIII shows rough estimates of the cost of C Schools based on the cost of A School. The weak link in the logic here is the assumption that the cost of career training past the initial entry level is roughly equal to 1.5 times the cost of the initial entry training. This is no more than an assumption. However, as discussed on pages 46-49, these figures do seem to be borne out by the limited data available.

To derive the average cost of C School training per man, per year, I have divided by the 16 years remaining in a 20 year career after the initial enlistment.

To calculate the cost per promotion, I have divided this figure by 5 (the number of promotions possible past the E-4 level).

APPENDIX IX

AVERAGE COST OF COMBINED MK3 TRAINING

	Cost/Graduate		Number of Graduates FY 78		Total Cost
Correspondence	$78.11	x	137	=	$ 10,701.07
A School	3276.21	x	644	=	2,109,879.24
			781		$2,120,580.31
					÷ 781

Average cost per graduate combining A & Correspondence = $2,715.21

Appendix IX shows the average cost of producing a Third Class MK when 137 come from the Correspondence route and 644 come from the MKA School. The cost per graduate has been multiplied by the number of graduates from each source. These products have been summed to produce the total cost and divided by the number of total graduates to produce the average cost per graduate combining A School and Correspondence Course sources.

APPENDIX X

Derivation of Career Training Costs under Various Alternatives

A L T E R N A T I V E

	1	2	3	4	5	6	7	8	9
E-4	3276.21	3276.21	3276.21	78.11	78.11	78.11	2715.21	2715.21	2715.21
5	982.86	117.17	1060.97	982.86	117.17	1060.97	982.86	117.17	1060.97
6	982.86	117.17	1060.97	982.86	117.17	1060.97	982.86	117.17	1060.97
7	982.86	117.17	1060.97	982.86	117.17	1060.97	982.86	117.17	1060.97
8	982.86	117.17	1060.97	982.86	117.17	1060.97	982.86	117.17	1060.97
9	982.86	117.17	1060.97	982.86	117.17	1060.97	982.86	117.17	1060.97
TOT	8190.51	3862.06	8581.06	4992.41	663.96	5382.96	7629.51	3301.06	8020.06
Rank	8	3	9	4	1	5	6	2	7

APPENDIX XI

Annual Training Costs At Various MK Ranks

Rank	Number Promoted To Rank Per Year	1	2	3	4	5	6	7	8	9
E-4 MK3	617	$2021421	2021421	2021421	48194	48194	48194	1675285	1675285	1675285
5 MK2	661	649671	77449	701301	649671	77449	701301	649671	77449	701301
6 MK1	313	307635	36674	332084	307635	36674	332084	307635	36674	332084
7 MKC	111	109097	12999	117768	109097	12999	117768	109097	12999	117768
8 MKCS	22	21623	2578	23341	21623	2578	23341	21623	2578	23341
9 MKCM	3	2949	352	3183	2949	352	3183	2949	352	3183
Total		3112396	2151473	3199098	1139169	178246	1225871	2766260	1805337	2852962
Ranked for Economy		8	5	9	2	1	3	6	4	7

Appendix XI shows the cost of the various alternatives
shown separately by rank in Appendix X when multiplied by
the number of people promoted to that rank.

Example: In Appendix VI it was shown that the cost of
graduating a man from MKA School was $3276.21. What would
the cost have been if all promotions had been by that method?
Multiply the number of promotions by the cost per promotion
(617 x $3276.21) for a product of $2,021,421. This process
is repeated for each rank for a total of $3,112,396 for
Alternative 1.

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APPENDIX XII

TRAINING DELIVERY SELECTION CHART FOR MK3

```
                          5      4    3    2    1
----- More important*  _x_ * ___* ___* ___* ___* Less important


----- More important*  ___ * ___* _x_* ___* ___* Less important

----- More important*  ___ * _x_* ___* ___* ___* Less important

----- Few (<20)      *  ___ * ___* ___* ___* _x_* Many (> 200)

----- Less important*  ___ * ___* _x_* ___* ___* More important

---------- Hands on *  _x_ * ___* ___* ___* ___* Theoretical

--- More difficult  *  ___ * _x_* ___* ___* ___* Less Difficult

-------------- Low  *  ___ * ___* _x_* ___* ___* High
                       _____
```

Preferred Method
    of
Training Delivery

```
    Resident    *  ___ * ___* 3.5* ___* ___* Correspondent
```

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TRAINING DELIVERY SELECTION CHART FOR BM3

```
                        5     4     3     2     1
-------- More important *___ * ___* ___* _x_* ___* Less important

-------- More important *___ * ___* ___* _x_* ___* Less important

-------- More important *___ * ___* ___* ___* _x_* Less important

------------- Few (<20) *___ * ___* ___* ___* _x_* Many (>200)

-------- Less important *___ * ___* ___* _x_* ___* More important

------------- Hands on  *___ * _x_* ___* ___* ___* Theoretical

------- More difficult  *___ * ___* ___* _x_* ___* Less difficult

------------------ Low  *___ * ___* _x_* ___* ___* High
```

Preferred Method
        of
Training Delivery
        Resident   *___ * ___* ___* 2.0* ___* Correspondent

APPENDIX XIV

TRAINING DELIVERY SELECTION CHART FOR AT3

                              5   4   3   2   1
------- More important*_x_ * ___* ___* ___* ___* Less important

------- More important*_x_ * ___* ___* ___* ___* Less important

------- More important*___ * _x_* ___* ___* ___* Less important

------------ Few (<20)*___ * ___* ___* _x_* ___* Many (>200)

------- Less important*___ * _x_* ___* ___* ___* More important

------------ Hands on *_x_ * ___* ___* ___* ___* Theoretical

------ More difficult *_x_ * ___* ___* ___* ___* Less difficult

------------------ Low *___ * ___* ___* _x_* ___* High

Preferred Method
      of
Training Delivery
         Resident *___ * 4.0* ___* ___* ___* Correspondent

98

LIST OF REFERENCES

1. "Procedure for Forecasting Recruit Inputs: Projections For Period '79-'92" U.S. Coast Guard Files.

2. Memo from Coast Guard Commandant (G-PE-9/72) dtd Apr 79.

3. A definition of terms may help the reader at this point. Within the Coast Guard (as well as the Navy) the term Rate refers to a job specialty. There are 28 Rates in the Coast Guard including Electrician, Radioman, Machinist, Storekeeper and others. The Navy has many more than 28 Rates.
   Rank refers to the level in the hierarchy. There are nine Enlisted Ranks to which an individual can be promoted based on performance at a resident school or competition on Servicewide Examinations. As shown in Appendix I, each Rate begins with the Rank of Petty Officer Third Class (E-4) and continues to the Rank of Master Chief Petty Officer (E-9).

4. Non-prior service are those personnel who have spent all their service time in the Coast Guard. Prior service personnel have spent some time in another uniformed service. Realizing that prior service personnel already have approximately 2 to 4 years service, their data does not vary significantly from non-prior service.

5. FY 77 was 15 months long (1 July 76 - 30 Sep 77) due to a change in budget cycle. The actual number of graduates (according to the school) during the 15 months was 1260. Multiplied by 12/15 the result is a load of 1008 students per year for the 15 month period.

6. Actual

7. Anticipated

8. Anticipated

9. The difference between quotas (source MK A School) and graduates (source Commandant PTE) may be attributed to attrition.

10. Commandant Instruction 1550.8A dtd 29 Dec 1977

11. U.S. Coast Guard Files

12. Annual Report and Report of Production Costs FY 1978: U.S. Coast Guard Institute

13. U.S. Coast Guard Personnel Manual, Paragraph 3-B-3

14. U.S. Coast Guard Personnel Manual, Paragraph 3-B-2

15. Recent data appears to lower the figure to 85% to 90%.

16. Salinger, Ruth D.: "Correspondence Study," in Training and Development Handbook, Ed. Craig, Robert L.: p. 38-10.

17. Childs, G.B.: "Correspondence Study: Concepts and Comments," paper presented at the National University Extension Association Annual Conference, Omaha, Nebr., 1973.

18. Childs, G.B.: "Recent Research Developments in Correspondence Instruction," paper presented at the Eighth International Conference on Correspondence Education, Paris, 1969.

BIBLIOGRAPHY

1. Childs, G.B.: "Recent Research Developments in Correspondence Instructions," paper presented at the Eighth International Conference on Correspondence Education, Paris, 1969.

2. Childs, G.B.: "Correspondence Study: Concepts and Comments," paper presented at the National University Extension Association Annual Conference, Omaha, Nebr., 1973.

3. Childs, G.B., et al.: An Annotated Bibliography of Correspondence Study: 1897-1960, prepared by the Committee on Research, Division of Correspondence Study, National University Extension Association, University of Nebraska, Lincoln, 1960.

4. Bower, R.B., An Investigation of the Lifestyles of Coast Guard Lower Enlisted Grade Families Concerned Specifically with Housing, Benefits and Use of Related Coast Guard Programs, Master's Thesis, Naval Postgraduate School, Monterey, California, Dec. 1975.

5. Cullen, J.G., et al.: "Cost Effectiveness: A Model for Assessing the Training Investment." Training and Development Journal, January 1978.

6. Davis, M.L., "Individualization of Instruction: A Conceptual Base for Understanding Instructional Planning and Student Development." Journal of Personalized Instruction, March 1977.

7. DePhillips, F.A., et al., Management of Training Programs. Homewood, Illinois: Richard D. Irwin, Inc., 1960.

8. Gringold, R.C. and Marshall, K.T. Navy Personnel Research and Development Center, San Diego, California, Manpower Planning Models - V Optimization Models. October 1975.

9. Holian, F.K., Cost Effective Training for Navy Senior Petty Officers, Master's Thesis, Naval Postgraduate School, Monterey, CAlifornia, Dec. 1977.

10. MacKenzie, O. et al., Correspondence Instruction in the United States. New York: McGraw-Hill Inc., 1968.

11. Mathieson, D.E.: Correspondence Study: A Summary Review of the Research and Development Literature, National Home Study Council, in cooperation with ERIC Clearinghouse on Adult Education, Washington, March 1971.

12. McGehee, William, and Thayer, Paul,. Training in Business and Industry. New York: John Wiley & Sons, Inc., 1961.

13. Migyanka, Joseph, "A Self-Instructional Supervisor Training Program? Improbable, But..." Training and Development Journal, October 1978.

14. Mitchell, Eddie. The Training Management Control System and the Army Training Environment, Master's Thesis, Naval Postgraduate School, Monterey, Califronia, December 1978.

15. Odiorne, G.S., "The Need for an Economic Approach to Training." Training and Development Journal, June 1979.

16. Rashad Abdulmohymen Abu-Alsamn. An Application of Markovian Chains in Manpower Planning, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1977.

17. Salinger, Ruth D., "Correspondence Study." Training and Development Handbook. New York: McGraw-Hill Inc., 1976.

18. Thompson, G.F., Unit Training Costs as a Part of Life Cycle Cost: A Methodology, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1978.

19. Tracey, William R., Designing Training and Development Systems, American Management Association, Inc., 1971.

20. Tracey, William R., Managing Training and Development Systems. AMACOM, 1974.

21. U.S. Coast Guard Institute Non-Resident Training Manual, 1978.

22. U.S. Coast Guard Institute Oklahoma City Annual Report and Report of Production Costs FY 78.

23. U.S. Coast Guard Personnel Manual, CG-207.

24. Wellens, John. The Training Revolution. London: Evans Brothers Limited. 1963.

25. Yates, Brian T., and Zimbardo, Philip G., "Self Monitoring, Academic Performance, and Retention of Content in a Self-Paced Course." _Journal of Personalized Instruction_, June 1977.

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